PB89-206189

Superfund Record of Decision (EPA Region 3): Ambler Asbestos Piles Ambler, Pennsylvania (First Remedial Action) September 1988

(U.S.) Environmental Protection Agency, Washington, DC

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U.S. Department of Commerce
National Technical Information Service
NTIS

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R03-88/057
September 1988

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EPA

Superfund Record of Decision:

Ambler Asbestos, PA

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REPORT DOCUMENTATION PAGE

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Ambler Asbestos Piles, PA
First Remedial Action

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401 M Street, S.W.
Washington, D.C. 20460

13. Type of Report & Period Covered 800/000

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The Ambler Asbestos Piles site is located in the southwestern portion of the Borough of Ambler, Montgomery County, Pennsylvania. Land around the site is used for industrial, residential, commercial, and transportation purposes. The site is bordered on the west by Wissahickon Creek and its flood plain. A low density housing development lies to the southwest. The site consists of four distinct areas of asbestos contamination: the Locust Street Pile, the Plant Pile, the Pipe Plant Dump, and the asbestos settling basins/filter bed lagoons. The waste piles of concern in this operable unit are the Locust Street Pile and the Plant Pile. Within a 0.25 mile radius of the Locust Street Pile are approximately 40 residences and a public playground that was closed in 1984. The K&M Company owned and operated the site from the late 1800s to 1962, and produced asbestos products such as paper, millboard, electrical insulation, linings, conveyor belts, and high pressure peckings. The primary wastes generated and disposed of in the Locust Street and Plant Piles during that period were spent magnesium/calcium (from pharmaceutical operations) and asbestos process waste. In 1962, Certainteed Corporation purchased a portion of the site and facilities from K&M and manufactured asbestos-cement pipe at the plant. Nicolet Industries, Inc. purchased the remainder of the site and manufactured asbestos millboard and monolithic products. The
(See Attached Sheet)

17. Document Analysis a. Descriptors
Record of Decision
Ambler Asbestos Piles, PA
First Remedial Action
Contaminated Media: sw, sediments, debris
Key Contaminants: asbestos

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement

19. Security Class (This Report) None

20. Security Class (This Page) None

21. No. of Pages 187

22. Price

(See ANSI-Z39.18)

See Instructions on Reverse

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
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EPA/ROD/R03-88/057
Ambler Asbestos Piles, PA
First Remedial Action

16. ABSTRACT (continued)

Locust Street Pile continued to receive asbestos waste from Nicolet until sometime after 1964; however, waste continued to be deposited on the Plant Pile until 1980. EPA and the Pennsylvania Department of Environmental Resources conducted their first investigation of the site in 1971, noting visible emissions and substantial dust concentrations attributed to asbestos. Subsequent investigations of the surface water, bulk waste samples and air samples in 1983 revealed asbestos contamination. In September 1983, the Centers for Disease Control issued a Public Health Advisory recommending the closure of the nearby playground. In 1984, EPA implemented emergency response actions to establish a soil and vegetative cover, install a drainage system, and provide erosion control measures over the Locust Pile. In addition, Nicolet had covered the Plant Pile by June 1984. The primary contaminant of concern affecting the sediments, surface water, and debris is asbestos.

→ is given. ← end.

The selected remedial action for this site includes: installation of a geotextile and soil cover on the exposed areas of waste piles; erosion control/repair on waste pile slopes to facilitate vegetation; pump and treatment (using filters) of surface water from lagoon and settling basins with onsite discharge, backfilling and regrading lagoon and settling basins to promote positive drainage, and onsite disposal of collected sediments and asbestos on the waste piles; implementation of slope stability control measures, if deemed necessary after testing; installation of gabions or rip-rap to prevent scouring action of Wissahickon Creek on the waste piles; runoff collection and treatment; preparation of a contingency plan; and access restructions. The estimated capital cost for this remedial action is $5,135,000, with estimated annual O&M costs of $46,000 to $63,000 for years 2 through 6 and $33,000 for years 6 through 30.

ATTENTION

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DIRECT QUESTIONS RESULTING FROM ILLEGIBILITY TO:

U.S. EPA
OSWER - HSCD

Record of Decision
Remedial Alternative Selection

Site: Ambler Asbestos Piles, Ambler, Pennsylvania

Statement of Basis and Purpose

This decision document represents the selected remedial action for the first operable unit at the Ambler Asbestos Site, in Ambler, Pennsylvania, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA), 42 U.S.C. Section 9601 et seq. and to the extent practicable the National Contingency Plan (NCP), 40 C.F.R. Part 300. This decision is documented in the contents of the administrative record for this site. The attached index identifies some of the items which comprise the administrative record upon which the selection of the remedial action is based (the administrative record will be updated in the near future). The Commonwealth of Pennsylvania has concurred on the remedy.

Description of the Selected Remedy

The selected remedy for the first operable unit seeks to prevent the release of asbestos from the site. A vegetative/soil cover will be installed over each of the two asbestos-containing waste piles (Locust Street-Pile and Plant Pile) to prevent airborne emissions, runoff will be collected and treated to assure no waterborne asbestos can go off site.

Additional components of the selected remedy are as follows:

- A geotextile and soil cover will be installed on the exposed plateau areas of the Locust Street and Plant Piles and on the exposed side slope areas of the Locust Street Pile.
- Repair to erosion on waste pile slopes due to storm events, soil creep, freeze/thaw effects, etc., will be implemented.
- Water from the lagoon and settling basins will be pumped and filtered for removal of asbestos fibers. Discharge of the treated water will occur on-site with placement of filter backwash on waste piles.
- The lagoon and settling basins will be backfilled with clean low permeability compacted soil bringing the depression up to grade to promote long-term positive drainage.
- Additional borings will be collected into and through the pile side slopes to supplement slope stability analysis previously performed.

- Slope stability control measures will be analyzed and implemented if the aforementioned studies are found to provide evidence of slope instability.
- Gabions or rip-rap will be installed to protect the toe of the Locust Street Pile from the scouring action of the Wissahickon Creek.
- Erosion/sedimentation controls during remedial activities will be implemented to facilitate the establishment of vegetation.
- Air monitoring for asbestos will occur during remedial activities (personnel and environmental).
- Post-closure inspections, maintenance of the piles, lagoon, and settling basin areas, and preparation of a contingency plan will be accomplished.

Other alternatives will be further evaluated as part of a Preremedial Design study to determine whether to pilot test for, and possibly institute, one of these alternatives for the site. If found to be unacceptable, based upon EPA's evaluation criteria under CERCLA for remedial actions, the Alternative 4 will immediately be implemented.

If any alternative processes are found to be acceptable, based upon EPA's evaluation under CERCLA for remedial actions, EPA would amend the ROD. Public comment would be solicited in the event of ROD amendment.

Declaration

The selected remedy is protective of human health and the environment, attains Federal and State Requirements that are applicable or relevant and appropriate to this remedial action and is cost-effective as set forth in Section 121 of CERCLA, 42 U.S.C. Section 9621(c) and Section 300.68 of the NCP. This remedy satisfies the statutory preference as set forth in Section 121(b) of CERCLA, 42 U.S.C. Section 9621(b) for remedies that employ treatment that reduce toxicity, mobility or volume of the hazardous substances, pollutants or contaminants. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. However, because treatment of the principal threat of the site was not found to be practicable, this remedy does not accomplish the statutory preference for treatment as a principal element of the remedy. It should be noted that, since asbestos cannot be combusted and is essentially chemically inert, a permanent remedy as such cannot be effectively implemented at this site. Therefore this remedy becomes the only currently feasible remedy under CERCLA for asbestos at this site.

Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted bi-annually for the first five years after initiation and of remedial action and yearly thereafter, and this complies with the requirement for review set forth in Section 121(c) of CERCLA, 42 U.S.C. Section 9621(c).

9-30-88
Date

Stanley L. Laskowski,
Acting Regional Administrator
EPA Region III

Summary of Remedial Alternative Selection for the Ambler Asbestos Site

Site Name, Description, and Location

The Ambler Asbestos Piles site is located in the southwestern portion of the Borough of Ambler, Montgomery County, Pennsylvania (see Figures 1 and 2). The site is bordered on the west by the Wissahickon Creek and its floodplain; on the northwest by Butler Pike, a major transportation route; on the north by Locust Street; and on the southeast by Church Street. A portion of the site extends westward from Ambler into Upper Dublin Township, Montgomery County. The Ambler Asbestos Piles Site consists of the Locust Street Pile, the Plant Pile, the Pipe Plant Dump, and the asbestos settling basins/filter bed lagoons Nicolet Inc. is the current owner of the Locust Street and Plant Pile, and the asbestos settling basins/filter bed lagoons. CertainTeed Corporation is the owner of the Pipe Plant dump.

The waste piles of concern in this operable unit are referred to as the Locust Street Pile and the Plant Pile. These piles contain spent magnesium/calcium carbonate and waste from the manufacture of asbestos products. The primary contaminant of concern at the site is asbestos.

Within a quarter mile radius of the Locust Street Pile are approximately 40 residential dwellings and a public playground that was closed in 1984. The center of the Borough of Ambler lies approximately a half mile north of the Locust Street Pile and the adjacent Plant Pile. A low density housing development lies to the southwest of the Locust Street Pile separated by the Wissahickon Creek and its floodplain in Whitemarsh Township, Montgomery County.

Individual discussions of the Locust Street Pile, Plant Pile and filter bed lagoons, along with the Pipe Plant Dump are presented in the following subsections.

A. Locust Street Pile

The Locust Street Pile is approximately 1200 feet long and 300 feet wide and averages 50 feet in height above grade. According to the topographic map developed prior to the Removal Action in 1984 (Figure 3), the Locust Street Pile ranges in elevation from approximately 240 feet above Mean Sea Level (MSL) at the top of the southwestern portion of the pile to 170 feet above MSL at the base on the western side of the pile adjacent to the Wissahickon Creek. The western side of the pile is adjacent to Wissahickon Creek.

The Locust Street Pile side slopes range from 2.5:1 to 2.0:1 (horizontal:vertical) on the north, east and south, and from 1.6:1 to 1.4:1 on the west. Slope lengths (angular) are

FIT team on May 12, 1986 which verified that no contaminants of concern are migrating from this source.

Site History

The K & M Company owned the site from the late 1800's to 1962. The company initially operated as a pharmaceutical company until 1897. The cornerstone of the K & M venture was milk of magnesium hydroxide. The primary material used in the manufacture of milk of magnesia is magnesium oxide. The plant was located in Ambler due to the close proximity of large reserves of dolomite from which the magnesia was extracted.

Asbestos products were produced by K & M from 1897 to 1962. These included paper, millboard, electrical insulation, brake linings, conveyor belt, and high pressure peckings (rubber and asbestos).

The primary wastes generated at that time were spent magnesium/ calcium carbonate (generated by the process of extracting magnesium carbonate from dolomite limestone) and asbestos process waste including bad manufacturing runs and off-specification products. Although, it was reported (Johnson and Schroder, 1977) that disposal activities did not begin on the Locust Street Pile until the 1930's it is suspected that K & M used the former quarry area (Locust Street Pile) to dispose of their wastes.

During World War II, the K & M Plant became one of the leading producers of asbestos products. During the period in which K & M operated the plant, the Locust Street and Plant Piles received much of the total volume of waste materials that were deposited on the piles. Aerial photographs of the site from 1950 prior to K & M selling the facility, indicate that approximately 80 percent by surface area of the Locust Street Pile was present. The northwestern portion of the pile was still active in 1950 receiving a calcium carbonate slurry contained by berms constructed of cinders. The southern portion of the pile did not appear active in 1950.

Based on the 1950 aerial photographs, the Plant Pile was approximately 60-70 percent complete and continued to receive primarily carbonate waste. Since 1950, wastes were deposited on the top of the piles contained by berms that were continuously built up to contain additional waste.

By 1958 there were indications of continued activity on both the Locust Street and Plant Piles. Additional material in the form of gray slurry has been pumped on the large plateau area of the Locust Street Pile. A large quantity of calcium/magnesium carbonate slurry was also deposited on the Plant Pile since 1950 as evidenced by aerial photographs. No activity was evident on the Pipe Plant Dump.

roughly 75 to 100 feet on the west and east and 25 to 75 on the north and south. The top of the pile is a relatively flat (0-3% slope) area which comprises approximately 20 to 25 percent of the total pile (crest) area. a relatively flat (0-3% slope) area which comprises approximately 20 to 25 percent of the total percent of the total pile (crest) area.

A report prepared by Johnson and Schroder of the University of Pennsylvania in 1977 for Nicolet Inc., stated that disposal for asbestos began waste in the 1930's at the Locust Street Pile Site. Disposal of general manufacturing waste may have begun earlier than the 1930's since the manufacturing of pharmaceutical and asbestos products at the site began in 1890's. The report stated that a quarry had existed at the Locust Street site prior to the disposal of wastes, but our investigation did not support its existence.

Products manufactured in the 1930's includes asbestos cement piping and shingles that required magnesium carbonate (magnesia) as a raw material. The process of extracting magnesia from dolomitic limestone produced 30 to 40 tons of carbonate waste per day. Once the quarry was filled (with spent magnesium carbonate), cinders and slag from the boiler plant were used to construct berms to contain the carbonate slurry. It was also reported in the Johnson and Schroder report that dumping of the carbonate waste on the northwest portion of the pile terminated in the early 1940's. Aerial photographs of the Locust Street Pile from 1950, 1964, and 1972 demonstrated continued dumping on this northwest portion (plateau area) of the pile until the late 1960's.

Deposition of wastes in the southern portion of the Locust Street Pile as reported by Johnson and Schroder began at the same time as the northwestern portion but received primarily cinders and bad production runs of piping, shingles, and millboard. Dumping on the southern portion of the Locust Street Pile was reported to have ceased in the late 1960's.

Analysis of waste samples taken from depths of 10-47 ft. below the surface detailed in a University City Science Center report, "Possible Health Hazards of Asbestos Waste Piles: Ambler, PA", (1975) indicate the carbonate waste consists of 70-85 percent calcium carbonate and 8-16 percent magnesium carbonate. Analysis for asbestos was not performed at that time. Surface samples taken by EPA's Emergency Response Team (ERT) and the Technical Assistance Team (TAT) in 1983 prior to the Removal Action from the Locust Street Pile indicated the presence of both types of asbestos and in significant concentrations predominantly on the large plateau area of the pile (Amosite 35-40% and Chrysotile 0-8%). Amosite asbestos fibers were primarily detected in samples taken from the side slopes of the Locust Street Pile at concentrations of 0-5 percent. Chrysotile was also found at concentrations of 2-10% in two of the ten samples taken of the exposed side slopes.

B. Plant Pile

The Plant Pile is approximately 650 feet in length and 600 feet in width. According to the 1984 topographic map (Figure the Plant Pile ranges in elevation from approximately 240 to 179 feet above MSL. The side slopes of the Plant Pile range from 2.0:1 to 1.7:1 (horizontal: vertical) on the north, 1.7:1 to 1.4:1 on the east, and 1.4:1 to 1.2:1 on side slopes of the Plant Pile range from 2.0:1 to 1.7:1 (horizontal: the south and west. Slope lengths (angular) are roughly 50 feet on the south, 100 feet on the east and west, and 120 feet on the north. The relatively flat (0-3% slope) area at the crest comprises approximately 40 to 45 percent of the Plant Pile area.

The Plant Pile is located southeast of the process plant and the asbestos filter bed lagoons. Disposal of wastes, beginning with calcium carbonate and magnesium hydroxide waste, was initiated on the Plant Pile in 1940's after the capacity of the Locust Street Pile was nearly reached (Johnson & Schroder, 1977). The carbonate waste was deposited as a slurry and contained by berms constructed of cinders and pumice rock. It was further reported that prior to 1964 a paper machine contributed some process waste. Aerial photographs of the Plant Pile from 1950 and 1958 demonstrate both a white and light gray slurry was pumped onto the Plant Pile. The aerial photographs of the Plant Pile from 1964, 1971, and 1978 show a change in the material deposited on the pile. The material deposited during this time was much darker than the material from previous photographs but was still being deposited as a slurry. From 1970-1975 it was reported that an asbestos cement sludge was pumped onto the Plant Pile. From 1975-76 asbestos millboard and the monolithic product process waste was pumped as a slurry to the Plant Pile. Continuous dumping was reported to have ceased in 1976; however, aerial photographs from 1978 and 1981 indicate continued activity on the Plant Pile.

C. Asbestos Settling Basins/Filter Bed Lagoons

The asbestos settling basins and filter bed lagoons are located between the Plant Pile and the Locust Street Pile. The settling basins and filter bed lagoons received process wastewater from the original manufacturing facility owned by Keasbey and Mattison Company (K&M). After the plant was purchased by Nicolet Industries, Inc. (now Nicolet Inc.) in 1962, the basins and lagoons continued to receive wastewater from processing and cooling operations. The two primary operations which reportedly contributed to the asbestos waste entering the filter bed lagoons are the millboard machines and the monolithic press. Based on aerial photography, the sludge from the lagoons was apparently dumped on the Plant Pile until 1978-79 via a pipeline. The lagoons received process wastewater, but the sludge was hauled off-site for disposal. Both the millboard machines and the monolithic press operations have been taken out of operation.

The only processed wastewater received as of the date of this document is non-contact cooling water from the sheet gasket machines, so little if any sludge should be produced. The most recent operational information concerning the wastewater management program, provided by Nicolet Inc., is dated July 25, 1979.

Beginning in 1973, the Pennsylvania Department of Environmental Resources (PADER) ordered Nicolet to stop dumping on the waste piles. This directly included the sludge from the filter bed lagoons. Nicolet maintains that in 1979 they installed a pelletizer unit to reduce solids entering the lagoons.

Based on information provided in the National Pollutant Discharge Elimination System (NPDES) permit application filed by Nicolet, Inc. on July 1, 1982, flow to the lagoons is 0.626 Million Gallons Per Day (MGD) and originates from the operations shown in the flow diagram in Figure 5. The primary water contaminant reported at that time was asbestos which originated from the millboard and monolithic press operations. Other potential contaminants that were identified on the application as "believed to be present" were chlorine, nitrogen (total organic), and surfactants. Wastewater from boiler blowdown and solvent recovery decant water is currently discharged to the Ambler Waste Water Treatment Plant (Ambler WWTP). The decant water contains methanol and toluene. Discharge of these waste streams to the Ambler WWTP began in 1980. Prior to this time, however, these process flows were also apparently discharged into the lagoons as eviden by residual organic odor detected emanating from the lagoons by EPA and the Remedial Investigation (RI) investigation team during the site visits for the studies.

D. Pipe Plant Dump

Adjacent to the Plant Pile, there is a previous dump site identified as the "Pipe Plant Dump." This pile reportedly received primarily asbestos-containing solid pipe scrap from 1962 to 1974. The Pipe Plant Dump was covered and vegetated in 1974 by the owner (CertainTeed Corporation). The Pipe Plant Dump is not currently part of this Record of Decision (ROD). The Pipe Plant Dump is part of the site on the National Priorities List (NPL) and therefore requires an RI/FS Remedial Investigation/Feasibility Study (RI/FS) to complete an Endangerment Assessment of this Pile. An RI is currently being conducted by CertainTeed Corporation, the Potentially Responsible Party (PRP) for the Pipe Plant Dump. A second ROD will be issued in the future for this second operable unit.

On November 11, 1985, the CertainTeed Pile was inspected by U.S. EPA, PADER, the REM II team, and CertainTeed Corporation. The cover on the pile was found to be in good condition and well vegetated. Little evidence of erosion and scouring along the south side by the unnamed tributary was observed. Surface water samples from the unnamed tributary were taken by the EPA

In 1962, CertainTeed Corporation, a manufacturer of construction materials, purchased a portion of the site and plant facilities from K & M, including the pipe manufacturing plant and THE Pile. Thereafter, CertainTeed manufactured asbestos-cement pipe at the plant. Nicolet Industries, Inc., a manufacturer of building and automobile supplies, purchased the remaining plant facilities along the Locust Street Pile, the Plant Pile, and the asbestos filter bed lagoons.

The aerial photograph of the site taken in 1964, following the purchase of the Locust Street and Plant Piles by Nicolet Industries, Inc., indicate disposal activity on the plateau areas of both piles since 1958. Wastes were apparently being deposited as a slurry but were dark gray and black in color compared to the white and light gray color of the waste in the previous aerial photographs. It appears then that the wastes deposited on the piles following the purchase of the site by Nicolet changed from primarily calcium/magnesium carbonate to process waste from the asbestos millboard and monolithic product manufacturing. This darker material may be sludge from the filter bed lagoons.

The 1964 photographs also shows the deposition of wastes on the CertainTeed Pile that included), asbestos-cement shingles, acoustical products and asbestos-cement piping. The wastes deposited were solids consisting of off-specification piping and process waste from the asbestos-cement pipe manufacturing facility.

The aerial photograph of the site nine years after the purchase of the Locust Street and Plant Piles by Nicolet Inc. indicate that disposal on the Locust Street Pile ceased sometime after 1964. Vegetation was evident on the two large plateau areas of the northwestern portion of the Pile and trees had grown along the slopes of the southern portion of the pile where no activity had been identified since 1950. Conversely, dark flow patterns on the Plant Pile indicated continued disposal of wastes. Trees were subsequently noted on the Plant Pile in 1971.

PADER and EPA became actively involved with the site in 1971, when a complaint was lodged with EPA by the Executive Director of the Wissahickon Valley Watershed Authority. From November 21, 1971 to January 18, 1972, a field survey water and air contamination at the site was conducted by EPA. Visible emissions were noted and substantial dust concentrations were measured and attributed to asbestos contamination.

In December 1971, Nicolet Industries, Inc. applied for approval to continue to dump on the Plant Pile. While this application was pending they continued to dump. Aerial photographs of the site from 1978 indicate continuous disposal on the Plant Pile since 1971. In 1973, PADER ordered Nicolet to stop dumping and to cover and stabilize the Plant Pile. Nicolet then applied for a solid waste management permit.

In February 1974, PADER issued an order to both Nicolet and CertainTeed concerning the termination of disposal operations. Shortly thereafter, CertainTeed Corporation discontinued its operations at the site, covered and vegetated the CertainTeed Pile, and moved operations out of the region; CertainTeed still retains ownership of the pile. Nicolet, however, appealed the PADER order and was subject to a subsequent order by PADER to cease its solid waste disposal. Nicolet continued dumping until 1980.

Aerial photographs of the site from 1984 showed a different flow pattern in the deposited waste on the Plant Pile than the 1978 photograph. In November 1978, amid increasing national concern about asbestos and other industrial wastes, EPA placed the Ambler site on a list of regulated asbestos sites pursuant to National Emissions Standards for Hazardous Air Pollutants (NESHAPS).

On June 2, 1983 the EPA's FIT team conducted a sampling program of the Locust Street Pile that included surface water, bulk waste samples and air samples. The results of the sampling program revealed downstream concentrations (260 MFL) of chrysotile fibers to be 10 times greater than the upstream concentrations (18 MFL). Bulk samples from the Locust Street Pile contained up to 30 percent chrysotile asbestos fibers and 3 percent amosite fibers. On September 15, 1983, U.S. EPA Region III On-Scene Coordinator (OSC) tasked the Technical Assistance Team (TAT) to conduct an assessment at the asbestos waste piles at the Nicolet, Inc. property. During the investigation, the TAT team observed steep, unvegetated and eroded slopes.

On September 27, 1983, the initial site assessment was conducted by the EPA Emergency Response Team (ERT), the PADER and the TAT. Air samples, bulk surface samples, and wipe samples from the playground equipment adjacent to the asbestos waste piles were collected. The samples were analyzed for asbestos and tested positive in the bulk surface samples and in the wipe samples. As a results these findings, the Centers for Disease Control (CDC) issued a Public Health Advisory recommending the closure of the playground. The OSC submitted a Request for Emergency Funding to initiate actions to alleviate the health risk caused by the piles.

On December 15, 1983, in accordance with CERCLA Section 104 and Section 300.65 of the NCP, EPA determined that the site posed an imminent and substantial danger to the public health and welfare and made the decision to proceed with an emergency response action. EPA requested that Nicolet cover the piles. However, Nicolet replied that it would not comply with the specific terms outlined by EPA.

District of Pennsylvania issued an order allowing EPA access to the Nicolet site in order to perform an emergency response action pursuant to Section 104 of CERCLA.

The EPA proceeded to implement the emergency response actions at the site, which included:

- Covering the Locust Street Pile with six to eighteen inches of soil;
- Stabilizing the covered slopes with erosion control netting;
- Hydroseeding the Locust Street Pile to minimize erosion;
- Installing a drainage system for the Locust Street Pile and;
- Dismantling and removing the Locust Street playground.

Covering of the Locust Street Pile was completed on July 22, 1984. EPA completed all drainage work, erosion control, and fencing by October 12, 1984. Upon completion of these tasks, EPA sampled several neighborhood homes for asbestos fibers and reported that nearby homes had not been contaminated by asbestos fibers during activity at the site. This latter activity was completed May 21, 1985.

In an independent effort, Nicolet began covering the Plant Pile on or about April 16, 1984, and completed the effort on June 1, 1984.

A site visit conducted by EPA on April 1, 1985 revealed erosion of the cover of the Plant Pile, while the Locust Street Pile was intact. EPA, Nicolet, and the REM II team personnel conducted joint initial site inspections on June 3 and June 11, 1985 to determine the scope of any required initial measures. It was recommended that the former playground area be landscape maintained for aesthetic, and vermin and insect management purposes.

In March 1985 EPA initiated the Workplan for the Remedial Investigation and Feasibility Study. The Study was completed August 1988.

CHRONOLOGY

Dates	**Event**
1890's	K & M Company started manufacturing products and disposed of pharmaceutical and asbestos waste adjacent to the plant in Ambler, PA.

Dates	**Event** (Cont.)
Early 1930's	Waste disposal at the Locust Street Pile was ongoing. The majority of the waste disposed on the pile consisted of carbonate residues from the processing of dolomitic limestone for the extraction of magnesia. The waste, in the form of a slurry, was added to the pile at a rate of 30 to 40 tons per day.
Early 1940's	Waste disposal at the Plant Pile began. Wastes disposed of from 1933 to 1962 included primarily a calcium carbonate slurry and later process waste from the asbestos paper machine operation.
1962	Nicolet Industries Inc. purchased most of the K&M facility including the Locust Street Pile, Plant Pile and filter bed lagoons. CertainTeed Corporation purchased the pipe manufacturing plant and the Pipe Plant Dump. Both companies continued to dump their wastes that consisted mostly of asbestos process waste and off-spec asbestos products.
3/71	NESHAP listed asbestos as a hazardous air pollutants.
11/15/71	EPA Region III received a complaint from the Executive Director of the Wissahickon Valley Watershed Authority about asbestos contamination of ambient air and the Wissahickon Creek, a tributary to the Schuylkill River.
12/2/71	Nicolet applied to PADER for a permit to continue using the piles for disposal of asbestos waste. Nicolet was required to have a permit under the PADER Solid Waste Management Act of 1968.
12/13/71	EPA field investigation started. Residents reported visual evidence of asbestos dust in homes and the playground on Locust Street whenever windy weather occurred. Also, surface water samples on the property indicated that waste streams leaving the CertainTeed and Nicolet Piles contained asbestos in excess of background concentration limits specified in 1971 Water Quality Criteria published by EPA in "Quality Cri-

Dates	**Event** (Cont.)
	teria for Water" (the Red Book). These criteria for asbestos were later replaced by criteria published in 45 F.R. 79318 (November 28, 1980).
1/3/72	Ambient air monitoring was initiated by EPA Region III. Field testing found 690 mg/m^3 and 270 mg/m^3 dust in ambient air at sites near the two plant locations, a great portion of which was attributed to asbestos presence.
3/2/72	CertainTeed applied to PADER for a permit to continue using the piles for asbestos waste disposal.
4/6/73	National Emissions Standards for Hazardous Air Pollutants (NESHAPS) for asbestos were promulgated by EPA with amendments proposed on 10/25/74 clarifying operation of waste disposal sites for asbestos. "No visible emissions" standard enacted for milling and manufacturing of asbestos products.
9/10/73	EPA Region III visited the asbestos piles at Nicolet and CertainTeed. Arrangements were made to sample ambient air over and around the piles.
10/22, 23, & 24/73	Ambient asbestos air monitoring was conducted. The following asbestos concentrations were recorded: - CertainTeed pile (114.5 ng/m^3) - Nicolet Pile (41-114 ng/m^3) - Nicolet settling lagoons (1,563 ng/m^3) - Locust Street playground (10 ng/m^3)
2/19/74	PADER issued an administrative order to Nicolet Industries and CertainTeed Corp. to cease dumping asbestos waste onto the piles. Pile access was limited and covering was ordered to be with material suitable for planting and growing vegetation. The piles were to be stabilized and water percolation and surface water management planned.
3/3/74	CertainTeed signed a consent order with PADER and agreed to follow PADER legal order of 2/19/74.

Dates	**Event** (Cont.)
4/17/74	PADER was told by Nicolet that they could not comply with PADER order of 2/19/74.
6/25/74	EPA proposed clarifying amendments to NESHAPS that regulate active and inactive sites for land disposal of asbestos wastes.
10/14/75	EPA promulgated clarifying amendments to NESHAPS that regulated active and inactive asbestos waste sites. 40 C.F.R. Section 61, Subpart M regulates the operation of waste asbestos dump sites. Waste collection and disposal included under "no visible emissions standard."
11/78	EPA placed the Ambler site on a list of NESHAPS asbestos sites among growing concern over the effects of asbestos.
3/79	EPA initiated a technical assistance program to help schools identify and control friable asbestos-containing materials.
6/83	NUS FIT sampling and testing performed on-site (air, waste, and water).
9/83	OSC, ERT, and TAT sampling and testing performed on-site (air, waste, and wipe samples).
12/83	The Centers for Disease Control issued a Public Health Advisory recommending, among other things, the closure of the playground located on the toe of the east side of the Locust Street Pile.
12/15/83	CERCLA fund authorization was obtained for an emergency response action at the site.
3/26/84	An emergency response action was undertaken which involved establishing a vegetated soil cover, placement of erosion control netting, and surface drainage system for the Locust Street Pile and playground site area. The playground was closed, dismantled and removed.
4/84	ERT sampling and testing performed (air).
9/84	ERT residential sampling performed (air and waste).

Dates	Event (Cont.)
10/84	Site proposed for inclusion on NPL.
5/85	REM II and EPA began RI/FS (Work Plan Phase) under CERCLA (Superfund).
6/85	REM II, EPA, and Nicolet conducted initial RI/FS site inspection.
10/85	Landscape maintenance of former playground area along Chestnut Street performed by a subcontractor to REM II.
11/85	CertainTeed Pipe Plant Dump (and other site areas) inspected by U.S. EPA, PADER, and the REM II team. Nicolet agreed to a partial records search by EPA and REM II, which was performed.
6/6/86	Site ranked 523 of 703 on the NPL.
9/3/86	Public meeting held at Ambler Borough Hall to present the RI/FS Work Plan.
9/ 30 - 10/2/86	A site inspection along with ambient air sampling, as part of the Designated Activities, was conducted by the REM II team.
12/29/86 - 8/21/87	RI field investigation conducted by the REM II team. Waste, cover soil, surface water, sediment, and ambient air samples collected and sent for analysis through EPA's Contract Laboratory Program (CLP).

Community Relations

During the removal action at the Ambler Asbestos site in 1984, EPA worked closely with Ambler Borough officials in disseminating information to the public. The residents who live on Locust Street the ones mostly interested in the site, since the playground that was their childrens' only recreation area had to be closed due to its close proximity to the asbestos piles.

On September 3, 1986 EPA held a public meeting to announce the start of the Remedial Investigation and Feasibility Study (RI/FS). During the months prior to the meeting, Borough officials became interested in the vitrification process by Vitrifix, Inc. to treat the asbestos piles. EPA met with the local officials at the beginning of the RI and assured them that the process would be reviewed along with other cleanup alternatives during the Feasibility Study (FS) phase.

An advertisement was placed in the Philadelphia Inquirer on May 31, 1988. The ad listed all of the cleanup alternatives and announced EPA's preferred alternative and started a 30 day public comment period for the proposed plan and RI/FS.

A public meeting was held on June 16, 1988 in accordance with Section 117(a)(2) of CERCLA, 42 U.S.C. Section 9617 (a) (2) and 40 C.F.R. Section 300.67 (d) with about 25 attendees in addition to Ambler Borough Council, PADER and EPA representatives. The residents requested EPA to place the site fence and signs as close to the piles as possible. The Mayor and Borough Council requested EPA to meet with other companies including Vitrifix, since the local officials are not in favor of EPA's containment alternative, and would prefer EPA look into other innovative technologies for remediating the asbestos piles.

The Borough Council and Nicolet, Inc. also asked EPA to extend the comment period thirty days. Originally EPA extended it only to July 13, then granted the request, ending the comment period on July 29. Another request for an additional three months came into EPA from Council. EPA did not extend the comment period, but did agree to meet with Borough officials on September 22, 1988. Ambler Borough Council invited their technical expert to the meeting. They asked that the Record of Decision not be signed so that their technical expert could look into other companies with innovative technologies for remediating the site. EPA explained that the signing of the ROD signifies that the containment alternative has been chosen, but the signing does not preclude the Agency from meeting with other companies with other innovative alternatives. A letter was sent to EPA Region III's Deputy Regional Administrator requesting delay of the ROD signing. That letter was received from the Ambler Borough solicitor on September 26, 1988.

As described above, EPA has met the public participation requirements of Sections 113 (K) (2) (B) and Section 117 of CERCLA, 42 U.S.C. Section 9617.

Contamination Problem

The ERT and TAT sampling and testing on and near the Ambler Asbestos Piles site demonstrated that asbestos fibers had migrated off the manufacturing site into adjacent public areas which included a neighborhood playground as evidenced by air, waste, and wipe sampling/analysis. The CDC issued a public health advisory closing the playground based on the evidence of air transport of asbestos fibers from the piles to areas where human contact could result from inhalation or ingestion, and an Immediate Removal Action was implemented in 1984.

The side slopes and some of the flat areas of the Locust Street and Plant piles are now covered as the result of the Removal Action by the EPA and an independent effort by Nicolet respectively. The large plateau areas of both piles remain uncovered. Portions of the slopes of the Locust Street Pile where large trees have grown are also exposed. Evidence of erosion and sloughing of the cover were evident on both piles during the RI. The currently exposed areas of both piles and/or future source areas of both piles exposed due to cover or slope failure create the potential for release of asbestos fiber to the ambient air that can be inhaled by local residents, and/or continued contamination of the adjacent surface water.

Physiography

The Ambler Asbestos Piles site lies within the Delaware River drainage basin. The area is characterized by relatively flat topography with occasional rolling hills with the greatest change in relief occurring along the flood plains of the many creeks and tributaries that flow through this area. Elevations within a mile of the site range from 160 to 300 feet above Mean Sea Level (MSL).

The site is located adjacent to the 100 year floodplain of Wissahickon Creek (see Figure 6). Wissahickon Creek flows along the western side of the Locust Street Pile. The 100 year floodplain along this side of the Pile reaches an elevation of 176 feet (MSL) or approximately 8 feet above the toe of the pile at creek's edge.

The Locust Street an Plant Piles rise above the natural grade 65 feet and 70 feet respectively, and therefore are a predominant feature in Ambler. The map view areas of the Locust Street and Plant Piles are approximately 422,000 square feet (9.7 acres) and 412,000 feet (9.5 acres), respectively (EPIC, June 1987). The estimated volume of these piles is approximately 464,000 cubic yards for the Locust Street Pile and 571,000 cubic yards for the Plant Pile (EPIC, June 1987).

Land Use

Land uses around the site included industrial, residential, commercial, and transportation. Figure 6 presents a land use map of the site and the area within 0.5 miles of the site based on zoning maps from Ambler Borough, Upper Dublin Township and Whitermarsh Township. Figure 7 depicts various land uses within an approximate 1.2 mile radius of the site based on land use identification using remote sensing data (EPIC, June 1987).

The Ambler Asbestos Piles site occupies approximately 22.6 acres of an industrial zoned area along the southwest border of the Ambler Borough line. Residential housing is located immediately northwest of the Locust Street Pile and approximately 500 feet east and west of the Plant Pile. Numerous educational and recreational facilities are located within 1.2 miles of the site. Agricultural land is located approximately 2,000 feet to the west (EPIC), June 1987.

Building and Structures

There are number of significant structures in the vicinity of the waste piles. In the Nicolet manufacturing area there are four major buildings housing various offices and production processes, as well as related structures for waste treatment, storage, and shipping. South of Wissahickon Avenue between Chestnut and Locust Streets are a number of row houses and single family homes. North of Wissahickon Avenue are a number of commercial and light-industrial establishments. The playground adjacent to the Locust Street Pile has been closed and all equipment removed.

Commuter rail tracks run parallel to Maple Street east of the Plant Pile and the Nicolet plant site.

Potential Receptors

There are a number of potential receptors within the vicinity of the waste piles. The nearest residence is within 200 feet northeast of the Locust Street Pile, and an estimated 6,000 persons live within 1/2 mile of the site.

The Nicolet manufacturing area is adjacent to the Plant Pile, Locust Street Pile and lagoons. In addition, there are number of commercial and lightindustrial establishments just north of Wissahickon Avenue within a few hundred yards of the site.

The Central Business District of Ambler is located approximately onehalf mile northeast of the waste pile and lagoons.

1. Air Quality

The Ambler Asbestos Piles Site is located in the Metropolitan Philadelphia, Interstate Air Quality Control Region (U.S. EPA, July 1985). This region is classified as an attainment area for all criteria pollutants except photochemical oxidants (precursors to ozone). The air quality within the air basin containing the Ambler Asbestos Site meets the national standards for sulfur dioxide (SO_2) and meets or exceeds the national standards for total suspended particulates (TSP). It cannot be classified as exceeding the national standards for both carbon monoxide (CO) and nitrogen dioxide (NO_2). The entire State of Pennsylvania does not meet the standard for ozone (O_3). Locally, air quality is potentially impacted by industrial and private sources.

II. Biological Resources

A. Terrestrial Resources

The Ambler Asbestos Piles site does support a significant terrestrial habitat on the covered waste piles. Crown vetch that was planted during the 1984 Immediate Removal action has flourished to provide then majority of the present vegetative cover on the waste piles. A variety of grasses and shrubs as well as young to mature trees are also supported in areas of the piles. The developed cover provides cover and habitat for species present in the surrounding area.

A variety of birds (hawk, pheasant, Canada geese, mallard duck, songbirds, and crowns) utilize the area for foraging and nesting purposes. Deer have been sighted on the Locust Street Pile. Other wildlife that have been sighted include racoons, ground hogs, muskrat, skunks, and squirrels.

Burrows have been observed on several slopes of the Locust Street and Plant Piles. The burrows extend into the cover and into the waste materials. Burrowing animals have caused minor problems in the re-exposure of waste materials at several locations on the piles.

B. Aquatic Resources

Wissahickon Creek runs along the south and west sides of the Locust Street Pile. The creek contributes to the Schuylkill River from which public water supply is taken 12 miles downstream of the site. Fauna supported in the Wissahickon in the vicinity of the site include sunfish, minnows, and eels. Wissahickon Creek is stocked annually with trout downstream of the site at Fort Washington State Park. The stream is fished from spring to summer. Most of the trout do not survive the summer due to high temperature and low dissolved oxygen in the stream.

III. Geology

The site study area is underlain by bedrock of the Stockton Formation of Triassic age. The Stockton Formation is described by Barksdale (1958) as consisting of light-colored, coarse-grained, arkosic sandstone and conglomerate; red to brown fine-grained siliceous sandstone; and red shale. The reddish arkosic units are the most characteristic of the Formation, especially the lower members of the Stockton Formation that underlie the site. Individual layers within the Stockton Formation commonly pinch out or grade into beds of different texture or mineralogy, and rarely can be traced for any significant distance. Sequences of beds, however, may persist for several miles. A geologic map of the Ambler United States Geologic Survey (USGS) quadrangle is presented in Figure 8.

The Stockton Formation crops out in an east-northeast trending band approximately five miles wide in the Ambler area. Bedding strikes northeast and dips to the northwest at 10 to 20 degrees. Bedding plans commonly show ripple marks, mud cracks, raindrop impressions, cross bedding, and pinch and swell structures. The thickness of the unit ranges from 1,000 to 5,000 feet and probably averages about 3,000 feet near the site. The Formation is extensively faulted and is cut by at least two sets of vertical joints, one parallel to strike and one at about a 50 degree angle to strike.

Weathering of the Stockton Formation generally results in deposits of sandy clay loams of vairable thickness that form an undulating topography of moderately low relief. Valleys are typically eroded into the softer sandstone beds while uplands are more commonly underlain by the arkosic beds. The depth of bedrock in the study area has been estimated to be less than 10 feet (Preliminary Assessment/Site Investigation, NUS, 1983). However, it has been reported that quarry activities may have occurred under the Locust Street Pile (Johnson and Schroder, 1977).

IV. Hydrology

A. Ground Water Hydrology

Ground water flows in the Stockton Formation through both primary intergranular openings as well as secondary joints and faults. Flow direction is locally quite variable and hydrologic boundaries are frequent. In general, regional ground water flow is either along the strike of the formation or down dip. To a great extent, the occurrence and movement of ground water in the Stockton Formation is controlled by the configuration of the base of the weathered zone and by vertical changes in the permeability of the deposits (Barksdale et al., 1958). In the vicinity of the waste piles, ground water flow is expected to be toward Wissahickon Creek. Shallow flow is likely to be unconfined while deeper ground water is under artesian or semi-artisian conditions. The depth to ground water has been reported to be less than 5 feet in this site area.

Aquifer tests in the Stockton Formation (semiartisian deeper ground water) indicate that the unit is one of the best sources of ground water in southeastern Pennsylvania. Transmissibility ranges from 1,000 to 35,000 gallons per day per foot (gpd/ft) with typical values between 5,000 and 9,000 gpd/ft. The storage coefficient ranges from 0.0001 to 0.000001 indicating a range of conditions from semi-artisian to true artesian. Well yields range from 1 to 900 gallons per minute (gpm) with typical values from 50 to 100 gpm. Specific capacity varies from 0.35 to 44 gpm/ft with a median value of about 6 gpm/ft (Barksdale et at., 1958; R. E. Wright Associates, Inc., 1982).

Water quality in the Stockton Formation is generally good but is highly variable depending on local hydrogeologic and land use conditions: Typical values of water quality parameters are: iron, 0.10 mg/l; manganese, 0.04 mg/l; bicarbonate, 84 mg/l; nitrate, 10 mg/l; sulfate, 24 mg/l; total dissolved solids, 150 mg/l; hardness, 100 mg/l; specific conductance, 250 micro-ohms/cm; and pH, 7.2 (R.E. Wright Associates, Inc., 1982). Water from the Stockton Formation is a primary source of drinking water for a number or private and public users including the Borough of Ambler.

Water supply for the site area is provided by the Ambler Borough Water Department through a series of nine supply wells. During the period from July through December 1983, individual supply wells pumped between 60 and 730 gallons per minute for a weekly total of between 1,500 and 2,400 gallons per minute. The municipal well nearest to the water piles is approximately 0.4 miles east of the Pipe Plant Dump. This well is 500 ft deep, and pumps roughly 100 gpm (NUS, 1983). The nearest known private (residential drinking water) well is the Burke well.

B. Surface Water Hydrology

The major surface water body in the area is Wissahickon Creek, which flows southeast at a gradient of roughly 22 feet per miles. The creek and its flood plain from the southern and western borders of the site. Prophecy Creek and several unnamed easterly flowing tributaries empty into Wissahickon Creek west (upgradient) of the site.

Surface drainage from the waste piles and the manufacturing areas flow to Wissahickon creek via storm sewers and small surface channels. Two borough storm sewers run underneath the Locust Street Pile. One of these pipes discharges into a drainage ditch west of Nicolet's filter beds and subsequently into the drainageway from the lagoons that flow into the Wissahickon Creek. The other large outlet (5' x 5' box culvert) is located just below the filter bed lagoons and discharges directly into the drainageway at the same point as the filter bed lagoons. No seeps were observed on the slopes of the Locust Street Pile and Plant Piles. White milky seeps were observed at the toe of the western side of the Locust Street Pile that run along the Wissahickon Creek. Bedrock outcrops at this toe. The seeps were observed coming from the interface of the bedrock and overburden.

The flood plain of Wissahickon Creek is a ground water discharge zone and several permanent and seasonal springs have been reported in the area. No specific data exists on the water quality or the rates of discharge of the springs.

Public Water Supply

Water supply for the site area is provided by the Ambler Borough Water Department through a series of nine supply wells. The municipal well nearest to the waste pile, Well No. 9 on Figure 9 is approximately 0.4 miles east of the Pipe Plant Pile. This well is 500 ft deep, and pumps roughly 100 gpm (NUS, 1983). Other municipal wells in the area are Well No. 4, which is 305 ft. deep and pumps at an average rate of 75 gpm, and Well No. 11, which is 500 feet deep and pumps at a rate of 100 gpm. All well water is pumped into common storage tanks. The only reported treatment to the water is the addition of chlorine. The water is tested periodically for total solids, color, odor, turbidity, sediment, pH, minerals, fecal coliform, chlorination by-products and volatile organics.

The nearest public water intake from surface waters is located approximately 12 miles downstream of the site on the Schuylkill River about one half mile downstream of the confluence of Wissahickon Creek and the Schuylkill River. Figure 10 is a flow diagram indicating how this water is treated based on conversations with the operators in December 1987. Both the flocculation and the rapid sand filtration treatment unit should remove most asbestos, if any is present in the water. Because of the treatment the water receives and the dilution that occurs when Wissahickon Creek flows into the Schuylkill River, asbestos would not appear to be a problem in the water from this intake.

Ground water is not expected to be a significant migration pathway for asbestos at this site. This is due to two factors: 1) the site's location in a hydrologic discharge zone where generally base flow is slightly upward and toward the stream; and 2) the relative insignificant subsurface downward or lateral migration of asbestos fibers in soil. To date, there is no documentation of ground water transport of asbestos particles (Dalton, U.S. EPA, 1985).

Field Investigation and Analytical Program

The field investigation and analytical program was designed to determine if potential public health risks and environmental impacts still exist at the Ambler Asbestos Piles site and if remedial action is needed in accordance with 40 C.F.R. Section 300.68 of the NCP. In order to complete the Endangerment Assessment the following Remedial Investigation/Feasibility Study objectives were identified:

- Locate immediate and/or potential future sources of asbestos release by identified pathways of migration (surface water, air) which can reach sensitive receptors resulting in public health risks and environmental impacts. This includes analysis of whether exposed asbestos could produce unacceptable risks to persons on-site by direct contact (either via authorized or unauthorized site entry);

- Identify contaminants other than asbestos that may pose an immediate or potential risk to public health and/or the environment;
- Determine whether the site is securely closed as a result of the previous "Removal Actions" (i.e., no pathways for asbestos or other contaminant release are found in quantity or concentration that pose a risk to human health or the environment).

Previous field investigations and studies have addressed the first objective, however, they were conducted prior to the 1984 Removal Action. This field investigation and analytical program was designed to address the objectives with regard to post-Removal Action site conditions. The investigation focused on addressing the following data gaps, in order to meet the RI/FS objectives:

- The content of the piles and especially the degree of asbestos containing materials within and up to 100 feet from the identified waste piles and lagoon area;

- An assessment of the condition, thickness, and long-term life of the cover materials over the two identified asbestos and process waste piles;

- Data on the physical/structural characteristics (shear strength, moisture content, consolidation properties) and material distribution of the piles;

- An evaluation of the present and future slope stability and potential settlement of the waste piles, as well as other on-site physical features that would affect contaminant migration, containment, and/or cleanup;

- The presence of asbestos in the sediments and surface waters at and adjacent to the site after the Removal Action;
- The present and potential impacts on the adjacent Wissahickon Creek;

- Information on background levels of asbestos in ambient air in Ambler and the surrounding area including the level of asbestos in the ambient air up and down gradient of the site after the Removal Action.

- The presence of contaminants other than asbestos at concentrations which pose a risk to human health and/or the environment.

These data gaps were organized into task objectives from which the phased field investigation was developed. Table 1 presents an outline of the phased Field Investigation Program. The task objectives listed in Table 1 relate to the tasks under each phase.

A phased approach was utilized to identify potential areas requiring further investigation and testing at an early stage. Phase I was performed in three subphases; site survey, non-intrusive sampling and intrusive sampling. Greater safety measures were employed during the intrusive sampling. Air monitoring was performed throughout the survey and sampling programs. An additional phase (Phase 2) was to be performed if contaminants of concern other than asbestos were found at concentrations that pose a potential health and/or environmental risk. A phase 2 program was not implemented based on the analytical results from waste sampling at the Locust Street and Plant Piles.

Description of Major Potential ARARs

An ARAR, as defined, is an environmental law, regulation, or guideline that is either "applicable" or "relevant and appropriate" to a remedial action. "Applicable" requirements are those cleanup standards, standards of control, and other environ mental protection requirements, criteria, or limitations, promulgated under Federal or State laws that specifically address chemicals/contaminants of concerns, remedial actions, locations of remediation, or other circumstances at a CERCLA-regulated site. "Relevant and appropriate" requirements are those which address problems or situations sufficiently similar to those encountered at a CERCLA-regulated site that their use is well suited to the particular site (Section 121 of CERCLA, 42 U.S.C. Section 9621 and 40 C.F. R. Section 300.68(i)).

ARARs can be divided into the following categories:

- Chemical/contaminant-specific requirements - Health or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, pollutants, or chemicals/contaminants. These limits may take the form of cleanup levels, discharge levels and/or maximum intake levels (such as for drinking water and breathing air for humans).
- Action-specific requirements - Controls or restrictions on particular types of remedial activities in related areas such as hazardous waste management or wastewater treatment.
- Location-specific requirements - Restrictions on remedial activities that are based on the characteristics of a site or its immediate environment. An example would be restrictions on wetlands development.

This section describes the chemical/contaminant-specific ARARs which relate to the Ambler Asbestos Piles Remedial Action. The action specific requirements will be discussed under the development of remedial alternatives. There are no location specific requirements for this site.

A review of various potential chemical/constituent specific requirements and the determination of which may be applicable, relevant, or appropriate to the Ambler site RI was conducted. The results are discussed in the remainder of this section.

Summary of Asbestos-Related ARARs

While asbestos has been used in industry for a long time, the regulation of asbestos is a relatively recent development. Most of the significant asbestos regulations were promulgated in the last 15 years; additional regulations will probably be introduced in the next few years.

The areas covered by the existing regulations include:

- Control of air emissions from industrial sources; and
- Air concentration limits for workers during abatement work and in schools;

A summary of the existing asbestos regulatory limits or goals is presented in Table 2. A category of existing guidelines will be discussed in a "To be Considered" section below.

The current regulations do not address either limits for asbestos concentrations in ambient air or asbestos concentrations in wastewater effluent. Most of the regulatory effort to date has been focused on occupational exposures in industrial and educational settings. The development of guidelines for the general population has moved less rapidly due to the complexity of sampling, analyzing and interpreting asbestos concentrations in ambient air. The existing regulations and occupational health studies can however be used as a guideline in evaluating the quality of ambient air and water at the Ambler site.

A brief discussion of potential applicable or relevant and appropriate asbestos regulations is presented in the following subsections.

- 40 C.F.R. Part 61, Subpart M -- National Emission Standards for Hazardous Air Pollutants.

Section 112 of the Clean Air Act, as amended, 42 U.S.C. Section 7412, requires that National Emission Standards for Hazardous Air Pollutants (NESHAPs) be set for hazardous air pollutants. The National Emission Standards for asbestos (Subpart M of 40 CFR Part 61) include standards for a variety of asbestos manufacturing, construction, and disposal operations.

Of particular relevance to the Ambler site is Section 61.153, "Standard for Inactive Waste Disposal Sites for Asbestos Mills and Manufacturing and Fabricating Operations." Each owner or operator is required to comply with one of the following:

- Either discharge no visible emissions; or
- Cover the waste material with at least 6 inches of compacted non-asbestos containing material, and grow and maintain a cover of vegetation; or
- Cover the waste material with at least 2 feet of compacted non-asbestos contacting material (no vegetation required); or
- Apply a dust suppressant that binds the dust and controls wind erosion.

The rules also include requirements for fencing, posting of warning signs, and long term monitoring involving visual inspection of the site for emissions.

TABLE 2

SUMMARY OF ASBESTOS REGULATORY LIMITS OR GOALS

MEDIUM	REGULATION	AGENCY	REGULATORY LIMIT OR GOAL
Air	40 CFR 61	EPA	No visible emissions to outside air.
	40 CFR 763	EPA	2 (fibers/cubic centimeter) by PCM (8 hour time weighted average) for asbestos abatement worker exposure. 0.02 f/cc TEM performance standard for remediation in schools.
	29 CFR 1910 and 29 CFR 1926	OSHA	0.2 f/cc by PCM (8-hr time weighted average) for industrial and construction worker exposure.
Water	45 FR 79318 (November 28, 1980)	EPA	Zero concentration in surface water for maximum protection of human health; drinking water concentration of 30,000 fibers per liter indicated to result in increased lifetime cancer risk 10^{-6}.

40 CFR 141

Proposed Maximum Concentration Level Goal (MCLG) of 7.1 million fibers per liter (fibers < 10 um) for drinking water.

40 CFR Part 763, Subpart G -- ASBESTOS ABATEMENT PROJECTS

Section 6 of the Toxic Substances Control Act (TSCA) provides EPA with the authority to control the manufacturing, processing, distribution, labeling, and disposal of chemical substances and mixtures. The regulations addressing asbestos under this Act are contained in 40 CFR 763. Subpart G of this rule, "Asbestos Abatement Projects," describes the requirements to be followed during asbestos abatement projects. The maximum 8-hour time-weighted average airborne concentration for any worker without protection in an abatement project is 2 f/cc (greater than 5 um size). The ceiling concentration is 10 f/cc (greater than 5 um size). Samples are collected on an 8 um filter using a high volume air pump and measured by Phase Contract Microscopy (PCM.)

Subpart E of this rule, "Asbestos-Containing Materials in Schools" sets requirements for remedial action in schools. It includes a standard for determining if further action is necessary after abatement. If the average concentration does not exceed the limit of quantification for the Transmission Electron Miscroscopy (TEM), no further action is required. The limit of quantification is defined as four times the analytical sensitivity. The analytical sensitivity is currently less than 0.005 f/cc of air. Thus, if the concentration is below 0.02 f/cc, no further quantification is required. Alternatively, if the average concentration is not significantly different than the outside concentration, no further action is required.

40 CFR Part 141 -- NATIONAL PRIMARY DRINKING WATER REGULATIONS

Section 1411-12 of the Public Health Service Act as amended by the Safe Drinking Water Act, 42 U.S.C. Sections 300 (g)-(g)(1), provides for the development of Maximum Contaminant Levels (MCLs) in drinking water. Under this rule, Maximum Concentration Level Goals (MCLGs) are to be initially developed, which are non-enforceable goals based entirely on health considerations. The MCLs represent enforceable drinking water standards which are to be set as close to the MCLG as is realistically feasible. MCLs are based on health, technical feasibility, and cost-benefit analysis. A MCLG for asbestos in drinking water of 7.1 million fibers per liter (MFL) for fibers greater than 10 um was proposed by EPA in 1985 based on an increased lifetime cancer risk level of 1 x 10-6. As of April 1988 an accompanying proposed rule (MCL) has not yet been promulgated.

The proposed MCLG is approximately two orders of magnitude higher than the existing Ambient Water Quality Criteria concentration, discussed in the previous subsection, because it is based on recent ingestion studies using laboratory animals (rats) rather than extrapolation of inhalation effects to ingestion. The results of this study showed no evidence of carcinogenicity for ingestion of the short-range fibers (<5 um) in either male or female rats and no evidence of carcinogenicity for ingestion of the intermediate range fibers in the female rats. However, there was an increase in benign polyps of the large intestine for the male rats ingesting the intermediate range fibers (.10 um) at a dosage of 1 percent of their diet.

COMMONWEALTH OF PENNSYLVANIA (STATE) ASBESTOS REGULATIONS

The Ambler Asbestos Piles are existing industrial waste piles. PADER currently regulates existing asbestos piles under the NESHAPS regulations. The NESHAPs regulations require a 6-inch vegetated cover for closure of asbestos disposal sites. NESHAP asbestos air emission standards state that no visible emission are permitted from an asbestos disposal site. The Locust Street and Plant Piles are not completely covered and therefore are not meeting NESHAPs regulations for closure. No visible emissions were observed however, from the uncovered areas during the RI field investigation.

Asbestos is a solid waste as defined under the Solid Waste Management Act, Act of July 7, 1980, Act No. 1980-97, 35 P.S. Section 691.1 et seq.. Disposal of asbestos and asbestos containing waste at an unpermitted facility in Pennsylvania is unlawful. Permitted facilities must comply with the Department's rules and regulations governing solid waste management facilities. The Commonwealth consistently requires that asbestos and asbestos containing waste be disposed at permitted solid waste management facilities subject to the above Act and the Department's rules and regulations governing solid waste management facilities. The State ARAR's applicable to closure of the Locust Street and codified in 25 P.S., Chapter 273. Applicable requirements related to slope design, cap design, vegetative cover, and surface water control are found in Chapter 273.

OTHER INFORMATION TO BE CONSIDERED

The information presented below, although not ARARs, were considered by EPA and the remedy selected is consistent with these guidelines.

To date, no ambient air standards for asbestos have been developed. Numerous ambient air studies have been conducted which have established background asbestos concentrations. These have been used to develop guidelines for identifying what concentrations may constitute "elevated" asbestos concentrations at various geographic locations. One prominent study was conducted by Dr. E.J. Chatfield for the Ontario Research Foundation in May 1983 which summarized the literature findings in this regard. Listed below are the recommended ambient air guidelines for several areas in the United States, Canada, and Europe based on the Chatfield study.

RECOMMENDED AMBIENT AIR GUIDELINES

State of Connecticut (proposed) - 30 day Average (electron microscopy)	30 ng/m3 or 30,000 total asbestos fibers/m3 (equates to 0.03 fibers/cc)
Province of Ontario - - 24 hour Average (electron microscopy) (>5 um)	40 fibers/liter (equates to 0.04 fibers/cc)
- 30 minute Average weight	5 ug/m3
Province of British Columbia (Optical)	<0.04 fiber/cc
West Germany (proposed) (electron microscopy) - (>5 um)	1 fiber/liter equates to 0.001 fibers/cc)
Montreal Urban Community (optical)	0.05 fiber/cc
New York City (recommended by Nicholson) (electron microscopy)	100 ng/m3
France (Conseil Superieur d'Hygiene Publique de France proposed ambient air quality inside buildings) (electron microscopy)	50 nf/m3

These guidelines and others developed by the scientific community are based on potential adverse health effects which have been indicated for asbestos exposures; and are discussed in greater detail in the Endangerment Assessment.

OCCUPATIONAL HEALTH AND SAFETY ACT (OSHA)
29 CFR Part 1910 AND 29 CFR Part 1926
(Latest revision April 30, 1984)

OSHA regulates asbestos exposure in the workplace. Occupational exposure to asbestos in all industries except construction is regulated by 29 CFR Part 1910. Construction industry exposure is regulated by 29 CFR Part 1926. The two rules are essentially the same. The rules address areas such as maximum exposure levels, workplace cleanliness, respirator use, and employee health monitoring. They set an 8 hour time weighted average Permissible Exposure Limit (PEL) of 0.2. fibers per cubic centimeter of air as determined by PCM. Only fibers longer than 5 um and a length-towidth ratio of 3:1 or greater are counted. If this concentration is exceeded, engineering controls must be implemented or work practices such as respiratory protection must be used.

45 FR 79318 -- AMBIENT WATER QUALITY CRITERIA
(November 28, 1980)

The EPA has published recommendations on toxic pollutant water quality criteria as required by 1977 amendments to the Clean Water Act, as amended. The criteria are not binding standards but rather guidelines for the states to use to establish surface water quality standards. Guidance was provided for 64 toxic pollutants including asbestos. The guidance document states that for maximum protection of human health, the ambient water concentration should be zero based on the assumption that there is no threshold below which asbestos is not a carcinogen. Recognizing that zero concentrations are probably not obtainable, the EPA estimated that an increased lifetime cancer risk of 10^{-5}, 10^{-6}, and 10^{-7} could result from ingestion of surface water containing asbestos concentrations of 300,000, 30,000 and 3,000 fibers/liter, respectively. These values were based on extrapolating the potential risk associated with ingestion of asbestos in drinking water. These guidelines were not based on ingestion studies.

Endangerment Assessment

EPA is required to undertake an Endangerment Assessment (EA) to properly document and justify its assertion that "an imminent and substantial endangerment to the public health of welfare or the environment "resulting from" an actual or threatened release of a hazardous substance may exist (Section 106 of CERCLA, 42 U.S.C. Section 9606). This EA addresses the potential human health and environmental impacts associated with the Ambler site under the no-action alternative, that is, in the absence of remedial corrective action).

The results of sampling performed during the Remedial Investigation (RI) in soil, surface water, sediment, and air were reviewed to identify chemicals to be evaluated in this Endangerment Assessment. Chemicals were selected for detailed evaluation if they were present in environmental media at concentrations above background concentrations and/or could be related to past disposal practices at the site. The chemicals that were selected (see Table 3) consisted of asbestos, the primary chemical of concern at the Ambler site (detected in all sampled environmental media), twelve inorganic chemicals, most of which were detected in surface water, and two categories of polycyclic aromatic hydrocarbons (PAHs), noncarcinogenic PAHs and carcinogenic PAHs. Among the selected chemicals, adequate toxicity values for use in a quantitative risk assessment were not available for five of the selected inorganics (aluminum, calcium, iron, magnesium and potassium). These chemicals were not, therefore evaluated in this Endangerment Assessment. Available data, however, indicate that these chemicals are of relatively low toxicity via the oral route compared to the other chemicals evaluated and most are also essential human nutrients.

Human Health Risk Assessment

Pathways through which individuals may be exposed to chemicals at and from the Ambler site were reviewed and those pathways most likely to be of concern to human health were identified for further analysis. The most important potential human pathways of exposure for the Ambler site that were evaluated were:

- Inhalation of asbestos in ambient air;
- Inhalation of asbestos during certain activities which stir up asbestos;
- Incidental ingestion of chemicals in surface water;
- Incidental ingestion of chemicals in soil; and
- Incidental ingestion of chemicals in sediment.

Under present site and land use conditions, the potentially exposed populations include residents living in the Ambler site area, individuals who work in the site area, and individuals who regularly visit the area (such as those using the Wissahickon Watershed Association facility). In the future, assuming no further remediation actions are taken at the site, additional residences or commercial facilities could be built adjacent to the site. Given the inherent instability of the Locust Street and Plant Piles it would not be feasible to build structures on them. However, other nearby on-site industrial construction or activities could potentially affect the piles and increase exposed areas of asbestos and migration of asbestos from the site.

Risks from the pathways listed above were characterized by first comparing concentrations of chemicals in the sampled environmental media to Applicable or Relevant and Appropriate Requirements (ARARs) identified for the Ambler site. Because ARARs were not available for all of the selected chemicals in all of the sampled environmental media, a quantitative risk assessment was also conducted. In this evaluation, estimates of potential chemical intakes through each pathway identified for evaluation were combined with the chemical specific toxicity values to predict potential risks associated with the Ambler site. For each pathway, an exposure scenario was developed based on assumptions about the environmental behavior and transport of the potential chemicals of concern, and the extent, frequency, and duration of exposures.

TABLE 3

SUMMARY OF ENVIRONMENTAL MEDIA Analysis

Chemical	Environmental Media in Which Substances were Detected								
		Surface Water			Soil			Sediment	
	Air	Creek	Drainage-ways	Lagoons	Borings < 4 ft.	Borings >= 4 ft.	Test Pits	Creek and Drainage-ways	Lagoon
Asbestos	x	x	x	x	x	x	x		x
Inorganic:									
Aluminum			x	x					
Barium			x						
Calcium			x			x		x	x
Copper			x			x		x	x
Iron			x						
Lead			x						
Magnesium			x			x		x	x
Manganese			x			x			
Nickel						x			
Potassium			x	x					
Silver			x	x					
Zinc				x		x			x
Semi-Volatile Organics:									
Organics:									
Carcinogenic PAHs:									
Beno(a)anthracene						x		x	
Benzo(b)fluoranthene						x			
Benzo(k)fluoranthene						x			
✓ Benzo(a)pyrene						x			
Chrysene						x		x	
Indeno(1.2,3-cd) pyrene						x		x	
Dibenzo(a,h)anthracene						x		x	

TABLE 3 (Continued)

SUMMARY OF ENVIRONMENTAL MEDIA Analysis

Chemical	Environmental Media in Which Substances were Detected								
		Surface Water			Soil			Sediment	
	Air	Creek	Drainage-ways	Lagoons	Borings < 4 ft.	Borings >= 4 ft.	Test Pits	Creek and Drainage-ways	Lagoon
Noncarcinogenic PAHs:									
Napthalene						x		x	
2-Methylnaphthalene						x			
Acenaphthene						x			
Fluorene						x			
Phenanthrene						x		x	x
Anthracene						x		x	
Fluoranthene						x		x	x
Pyrene						x		x	x
Benzo(g,h,i)Perylene						x		x	

These factors were used to predict potential exposures to the set of selected chemicals for both an average and a maximum plausible exposure case. For noncarcinogens, results are presented as the ratio of the Chronic Daily Intake (CDI) of each chemical to its Reference Dose (RfD), and as the hazard index, which is the sum of the CDI:RfD ratios for each chemical. If the hazard index exceeds one, health hazards might result from such exposures. In the case of carcinogens, the excess upper bound lifetime cancer risk was estimated; this risk is expressed as a probability. A risk of $1x10^{-6}$, for example, represents the probability that an individual will develop cancer as a result of exposure to a carcinogenic chemical over a 70-year lifetime. EPA has suggested developing remedial alternatives for cleanup of Superfund sites for total excess lifetime cancer risks from 10^{-7} to 10^{-4}.

For asbestos, based on the comparison to chemical-specific ARARs, it was concluded that under present site use conditions the "no visible emission" criteria for asbestos developed under the Clean Air Act is not currently being exceeded. In the future, however, increased erosion and weathering of the piles could increase the potential for visible asbestos emission. In addition, exceedance of these asbestos regulations would likely occur if the site were disturbed by vehicular activities. Such activities would most likely occur as part of a remedial action involving removal of the site were disturbed by vehicular activities. Such activities would asbestos contaminated soil from the site. In addition, concentrations of asbestos measured in surface water would exceed the Ambient Water Quality Criterion for the protection of human health.

It was concluded that potential releases of asbestos to ambient air from the Ambler site may occur due to the existence of exposed areas containing asbestos. It was further concluded that potential human health risks to nearby residents may be associated with releases of asbestos from such exposed areas at the site into ambient air.

Potential asbestos inhalation exposures during specific types of activities that can stir up asbestos fibers, such as children playing in soil on the piles, were also qualitatively evaluated. Under present site use conditions at the Ambler site, activities that could stir up asbestos fibers include playing and biking on the piles by children and outdoor tasks conducted by workers employed in the site area (e.g., employees at the Nicolet plant). It was concluded that these and other activities could continue to occur in the absence of site remediation (i.e., under the no-action alternative). Among sub-populations who may repeatedly engage in these types of activities, cumulative asbestos exposures of concern to human health could potentially result.

Quantitative risks were estimated for the remaining exposure pathways. The results are summarized by pathway in Table 4 for both noncarcinogenic and potentially carcinogenic chemicals.

Risks associated with incidental ingestion of surface water by children playing in Wissahickon Creek, drainageways and standing surface water were evaluated for selected chemicals (asbestos and seven inorganic chemicals). The excess lifetime cancer risks for asbestos were estimated for three separate areas, Wissahickon Creek, drainageways and standing surface water off-site behind the piles, and drainageways near the Maple Avenue piles (upstream of the Ambler site). The cancer risks ranged from $3x10^9$ for the average case to $7x10^8$ for the maximum plausible case. It should be noted that there are several sources of asbestos in Wissahickon Creek (e.g., other than the Ambler site) and thus risks associated with ingestion of asbestos from Wissahickon Creek cannot be attributed solely to the Ambler site. Among the other chemicals selected for evaluation in this risk assessment, only inorganics were detected in standing surface water and drainageways. All of these inorganic chemicals are noncarcinogens for which EPA has developed reference doses (RfDs). All of the chemicalspecific CDI:RfD ratios for the detected inorganics were well below one as was the hazard index (the sum of all the chemicalspecific ratios), indicating that noncarcinogenic effects would not occur from this exposure pathway.

Risks associated with incidental ingestion of chemicals present in on-site soil by children were evaluated for those chemicals detected in surface soil samples (asbestos from zero to four feet and PAHs from four to seven feet). For the noncarcinogenic PAHs, the ratio of the CDI to the RfD was well below one, indicating that adverse noncarcinogenic human health effects would not occur. The total excess lifetime cancer risks were estimated to range from $1x10^{-6}$ for the average case to $6x10^{-5}$ for the maximum plausible case; both risks were basically associated with ingestion of asbestos. It is important to recognize the complexity involved in estimating cancer risks for incidental ingestion of asbestos present in soil.

EPA has developed a unit risk factor for exposure to asbestos in surface water only. and not for exposure to asbestos from other environmental media where concentrations may be reported on a mass (not fiber) basis. In order to quantify risks associated with incidental ingestion of asbestos in soil, the EPA unit risk factor was converted into a mass-based potency factor. Based on this conversion, the excess lifetime cancer risks for incidental ingestion of asbestos from soil were estimated to be $1x10^{-}6$ for the average case and $6x10^{-}5$ for the maximum plausible case. Because of the uncertainty inherent in converting from a fiber-based unit risk factor to a mass-based potency factor, the uncertainty associated with risks related to exposure to asbestos through this pathway may exceed an order of magnitude uncertainty. Additional uncertainty is added by the fact that only benign tumors were noted in the bioassay which is the basis of the potency factor.

TABLE 4

SUMMARY OF POTENTIAL RISKS ASSOCIATED WITH EXPOSURE PATHWAYS QUANTITATIVELY EVALUATED FOR THE AMBLER ASBESTOS SITE

	Hazard Index[a]		Excess Upper Bound Lifetime Cancer Risk[b]	
Exposure Pathway	Average Case	Maximum Plausible Case	Average Case	Maximum Plausible Case
Ingestion of surface water[c]				
- Wissahickon Creek	NS	NS	$3x10^{-9}$	$1x10^{-8}$
- Drainageways and standing surface water	<1	<1	$5x10^{-9}$	$3x10^{-8}$
- Near Maple Avenue piles	NS	NS	$3x10^{-8}$	$7x10^{-8}$
Ingestion of on-site soil	NS	NS	$1x10^{-6}$	$6x10^{-5}$
Ingestion of sediment from drainageways and standing surface water	<1	<1	$4x10^{-8}$	$3x10^{-6}$

NS = Chemicals other than asbestos were not sampled for in these areas.

[a] The hazard index indicates whether or not exposures to mixtures of noncarcinogenic chemicals may result in adverse health effects. A hazard index less than one indicates that adverse human health effects are unlikely to occur.

[b] The excess upper bound lifetime cancer risk represents the additional probability that an individual may develop cancer over a 70-year lifetime as a result of the specific exposure conditions evaluated.

[c] The only carcinogenic chemical detected in surface water samples was asbestos and thus the listed risks are associated solely with asbestos ingestion from surface water.

Exposures and risks associated with incidental ingestion of sediment were evaluated for children who may play in the Wissahickon Creek area, drainage-ways, or standing surface water pools. The selected chemicals that were detected were copper and PAHs; these chemicals were detected in drainage-way sediments. Asbestos was not detected in drainageway or creek sediments. The CDI:RfD ratios for copper and noncarcinogenic PAHs and the hazard index were well below one indicating that adverse noncarcinogenic PAHs in sediments, the excess lifetime cancer risks were estimated to range from $4x10^{-8}$ for the average case scenario to 3×10^{-6} for the plausible maximum case scenario. The source of the PAHs cannot be attributed solely to the Ambler site.

Ecological Risk Assessment

The following pathways by which environmental receptors at and near the Ambler Asbestos Piles site could be potentially exposed to contaminants originating at the site were considered:

- Contact with and ingestion of water by aquatic life in Wissahickon Creek, and drainage ditches feeding into the creek and other surface water;
- Direct contact with and ingestion of soil by birds and mammals when preening, grooming, or foraging for food;
- Ingestion of prey by birds and mammals;
- Ingestion of surface water by birds and mammals; and
- Uptake of contaminants in the (PAHs) soil by plants.

Based on a qualitative assessment of the potential impacts of the above exposures, the following conclusions were reached, that there is an adverse impace to the local ecology. (This information is detailed in the RI/FS).

ARARs for the remaining selected chemicals consist of Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) under the Safe Drinking Water Act and Ambient Water Quality Criteria (AWQC) for the protection of human health. Chemical concentrations measured in surface water at and near the site can be compared to these ARARs although none of the sampled surface water bodies are being used or are planned to be used as a drinking water source. Concentrations of the selected chemicals (twelve inorganic chemicals, most of which were detected in surface water, and two categories of polycyclic aromatic hydrocarbons (PAHs), non-carcinogenic PAHs and carcinogenic PAHs), and five inorganics (aluminum, calcium, magnesium, and potassium) in lagoon surface water did not exceed the available ARARs. Among the chemicals detected in standing surface water and drainageways (only asbestos was sampled for in Wissahickon Creek), the maximum concentrations of lead, manganese and nickel exceeded the proposed MCLG, the secondary MCL (not health-based) and the AWQC, respectively. The geometric mean concentration of manganese also exceeded the secondary MCL.

It should be noted that this comparison was very conservative in that none of these surface water bodies are being used or planned to be used as drinking water sources. These chemicals were not, therefore, evaluated in the EA. Available data, however, indicate that these chemicals are of relatively low toxicity via oral route compared to the other chemicals evaluated and most are also essential human nutrients.

ALTERNATIVE DEVELOPMENT

The overall objective of the CERCLA Feasibility Study (FS) process is the identification of the most appropriate, cost-effective[a] alternative(s) for remediation of a site the effectively mitigates and minimizes threats to and provides adequate protection of public health and the environment and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable (See Section 121(b), (d), of CERCLA, 42 U.S.C. Section 9621(b), (d) and 40 C.F.R. Section 300.68(i)). In accordance with Secti 121(b) of CERCLA, emphasis in the FS for the Ambler Asbestos Piles site was placed on remedial technologies that reduce the toxicity, mobility, or volume of wastes and contaminated materials.

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[a] In the legislative history to the 1986 amendments to CERCLA Congress clarified its definition of cost-effective remedial action (Congressional Record, October 3, 1986, page H9102) as follows: "The term costeffective means that in determining the appropriate level of clean-up, EPA first determines the appropriate level of environmental and health protection, and then selects a cost-effective means of achieving that goal. Only after EPA determines, by selection of applicable or relevant and appropriate requirements (ARARs), that adequate protection of human health and the environment will be achieved, is it appropriate to consider cost-effectiveness."

The General Response Section that follows identifies the general response actions and associated remedial technologies applicable to this site. The initial screening of potential remedial technologies, based on RI information, is presented in a subsequent section. The technologies are screened to eliminate those that have limitations for specific chemical constituents and site characteristics, or have inherent technological limitations. This screening is performed in accordance with 40 C.F.R. Section 300.68 and Section 121 of CERCLA.

GENERAL RESPONSE ACTIONS

A number of general response actions have been identified for the Ambler Asbestos Piles site based on the information and data presented in the RI. These response actions, the associated remedial technologies, and the site problem areas to be addressed are presented in Table 5. The identified response actions and technologies include source control and management measures, as well as "no action." The no action response alternative is used as a base line against which other measures are evaluated.

The on-site sources of current and future public health risks have been identified as the asbestos-containing waste materials in the piles and surface water/sediment of the settling basins and filter bed lagoons. As a result, remedial technologies are considered that primarily address asbestos. The remediation of the spent magnesium/calcium carbonate, which constitutes a significant portion of both piles, is also considered in the screening process.

TABLE 5

GENERAL RESPONSE ACTIONS AND ASSOCIATED REMEDIAL TECHNOLOGIES FOR THE AMBLER ASBESTOS PILES SITE

General Response Action	Potential Remedial Technologies to be Screened	Site Problems Primarily Addressed
No action	Monitoring Upgrade Site Security	Does not address site problems except for reducing human and wildlife contact of exposed areas areas of the piles and surface water/sediment of settling basins and filter bed lagoon

General Response Action	Potential Remedial Technologies to be Screened	Site Problems Primarily Addressed
Surface Water Management, and Erosion Control/Sedimentation Measures	Surface Water Management - Regrading and revegetation - Diversion ditches and interception trenches - Sedimentation ponds and basins	Improves drainage patterns from piles (tops and side slopes to minimize further asbestos exposure). Divert runoff to minimize cover erosion on slopes and collects runoff to control sediment sediment transport off-site.

Capping	Capping Techniques
	- Synthetic membranes
	- Low permeability soils
	- Surface sealing
	  - Soil/bentonite admixtures
	  - Asphalt/concrete
	- RCRA-type multilayer
	- Stabilizing cover system
		Contains asbestos fibers in pile waste material and sediments in basins and lagoons preventing entrainment of fibers into ambient air and surface wate

Complete or Partial Removal	Excavation/Dredging of Solids, Pumping and Filtration Liquids	Removes source of asbestos in surface water sediments, and waste piles.
In Situ Treatment	Thermal Treatment - In situ vitrification	Stabilizes asbestos in order to prevent entrainment of asbestos fibers into ambient air.
On-Site	Thermal Treatment - Vitrification solidification/stabilization - Cement/poozolanic - Thermoplastic microencapsulation - Precipitation/flocculation/sedimentation - Filtration - Evaporation	Reduces mobility and/or toxicity of asbestos contaminants.

TABLE 5
(continued)
GENERAL RESPONSE ACTIONS AND ASSOCIATED REMEDIAL TECHNOLOGIES FOR THE AMBLER ASBESTOS PILES SITE

General Response Action	Potential Remedial Technologies to be Screened	Site Problems Primarily Addressed
Off-Site Treatment	Solidification/Stabilization - Cement/Pozzolanic - Thermoplastic micro-encapsulation Physical/Chemical Treatment - Precipitation/flocculation/ sedimentation	Stabilize asbestos to prevent/reduce entrainment of asbestos into ambient air and transport area surface water. Removal of asbestos fibers in lagoon surface water prior to discharge to creek
Off-Site Disposal	Landfill	
On-Site Disposal	Landfill	Containment of asbestos in waste piles and lagoon sediments.

The objective of remediation of the asbestos-containing waste is to prevent migration into the ambient air and transport via stormwater runoff to Wissahickon Creek. A consideration of remediation of the magnesium/ calcium carbonate is to improve the physical characteristics (increase strength, lower moisture content) in order to improve the stability of the piles and/or allow for off-site transport of this material. The objective of remediating the surface water in the settling basins and filter bed lagoons is to allow for discharge to Wissahickon Creek, or potentially to the local Ambler Wastewater Treatment Plant.

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES

The surface area volume of the waste piles, lagoon surface water, and sediments containing asbestos were estimated using pertinent surface and subsurface data.

A breakdown of the estimated volumes and surface areas are presented below.

Waste Piles	Volume (cu. yds.)
Plant Pile	615,000
Locust Street Pile	640,000
Settling Basins/Filter Bed Lagoons	
Sediments (assume 3 ft. thick)	4,500
Surface Water	1.9 x 106 gallons
Surface Area	40,500 sq. ft.

SCREENING PROCESS

The objective of this screening is to initially identify the remedial technologies best suited for further consideration in developing remedial alternatives for the Ambler Asbestos Piles site. The focus of the screening process is to eliminate technologies, based on information obtained from the RI, that are not feasible because they may prove difficult to implement or have severe limitations that would prevent achievement of the remedial objectives. The technologies are considered according to their technical feasibility in relation to site and waste characteristics and applicability to the problem areas of the site and cost.

Potential remedial technologies will be screened using the following process. First, a brief description of the technology is presented with a discussion of its potential application to site problem areas. Then, a discussion of the technical reliability (technology development, performance, and safety) and implementability in relation to site, waste, and technology characteristics is represented. The technologies are also screened for their suitability to the site according to environmental, public health, and institutional considerations. A recommendation is then made to retain or eliminate the technology for further consideration based on the criteria described.

SUMMARY OF TECHNOLOGIES

The screening of the remedial technologies is summarized in Table 6. The technologies that have been retained after the screening process for use in developing remedial action alternatives are listed as follows:

- No action with security upgrade and monitoring;
- Surface water management and erosion and sediment controls;
- Stabilizing cover system and stabilization of existing cover soils;
- Complete or partial removal;

- On-site solidification/stabilization;
- On-site precipitation/flocculation and sedimentation;
- On-site filtration;
- On-site vitrification;
- Off-site disposal.

DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES

Remedial action alternatives have been formulated hereafter to address the environmental issues and contaminant pathways related to the Ambler Asbestos Piles site. These alternatives have been developed based on the following considerations:

- The remedial alternatives were formulated using the technologies retained from the screening process discussed previously. The technologies considered to be applicable to the remediation of the identified environmental issues of the Ambler Asbestos Piles site are summarized in Table 6.

- Techniques that are complementary and/or interrelated were combined into alternatives. For example, in one alternative -- On-Site Closure, installation of an improved cap on the waste piles is combined with back-fill of the lagoon, on-site sedimentation and erosion controls, protection against scouring along the creek, and surface water treatment (of lagoon water).

- The alternatives were also developed to address the remedial action objectives established for the site. Not all of the alternatives developed will equally satisfy the objectives or be as effective in addressing part or all of the site issues and contaminant pathways.

- The purpose of the alternative development process is to cover a range of effective remedial action alternatives. (See 40 C.F.R. Section 300.68). Therefore, the alternatives were differentiated according to the degree of remediation they provide. Various remediation categories under source control action specify a range of remediation levels. These categories are as follows:

  No action: No action alternatives may include minimal actions such as installation of fences/ gates and monitoring activities.

  A number of treatment alternatives ranging from one that would eliminate, or minimize to the extent feasible, the need for long-term management

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Table 6 (continued)

General Response Action And Associated Remedial Technologies	Retained for Alternative Development	Technical Considerations	Other Considerations	Recommended Application to Site Problem in Remedial Alternative
b. Physical/chemical: Precipitation/ flocculation and sedimentation	Yes	Proven technology and commonly used treatment process. Has been demonstrated effective for removal of asbestos from water. Laboratory bench-scale or pilot-scale testing required to determine effectiveness and optimum process parameters.	Eliminates risk to public health and environment (Wissahickon Creek) due to off-site migration of asbestos contaminated water. May require polishing step to conform with discharge permit/regulations. By product sludge requires disposal/treatment. Relatively low cost; equipment readily available.	Lagoon surface water
c. Physical: Filtration	Yes	Proven technology and commonly used treatment process. Has been demonstrated effective for removal of asbestos from water. Use as first treatment step may result in rapid clogging of micropore filters. Laboratory bench-scale or pilot-scale testing required to determine effectiveness and optimum process parameters.	Eliminates risk to public health and environment (Wissahickon Creek) due to off-site migration of asbestos contaminated water. May require polishing step to conform with discharge permit/regulations. By product sludge requires disposal/treatment, Relatively low cost; equipment readily available. Backwash or spent filters require disposal/treatment may be effective as polishing step for other treatments.	Lagoon surface water
d. Physical: Evaporation	No	Proven technology for treatment of various municipal and hazardous wastes. Most effective for treatment of wastes with high solids content; lagoon waters may not exhibit desireable characteristics for effective treatment. Data not available to show process demonstrated effective for treatment of wastes similar to those at site. Laboratory bench and pilot scale tests would be required.	Potential risk due to public health from entrainment of fibers in process vapor stream. Waste stream would require further treatment. Permitting not required under SARA; regulatory agency approval required.	Not Recommended

Table 6 (continued)

General Response Action And Associated Remedial Technologies	Retained for Alternative Development	Technical Considerations	Other Considerations	Recommended Application to Site Problem in Remedial Alternative
5. In Situ Treatment				
a. Thermal: In situ vitrification	No	Developing technology that has been successfully tested on large-scale (400 to 800 tons) radioactive waste materials. Vitrified mass expected to have long-term stability. Pilot studies required before implementation. Problems may be encountered due to heterogeneity of waste materials. Installation of electrodes may be difficult or impractical due to steep slopes and low strength of piles. Power requirements may be excessive due to high moisture content of materials. Potential exists for collapse of piles during treatment.	Could effectively immobilize inorganic contaminants. Costs could be restrictive due to high power requirements.	Not Recommended
6. On-Site Treatment				
a. Thermal: Vitrification	Yes	Developing technology demonstrated on limited basis on pilot-scale for treatment of asbestos insulation materials from abatement actions. Pilot testing would be required prior to implementation at the site. Problems could be encountered due to heterogeneity of the waste materials (such as high moisture content, presence of high concentrations of calcium/ magnesium carbonate).	Vitrified mass would require disposal. Risks to public health and environment could be eliminated; asbestos immobilized. Potential exists to recycle glassified product. Potential risks associated with removal activities from release of asbestos to air. Regulatory and local agencies approvals required. Major potential ambient air problem during remeidal action.	Waste piles lagoon sediments

Table 6 (continued)

General Response Action And Associated Remedial Technologies	Retained for Alternative Development	Technical Considerations	Other Considerations	Recommended Application to Site Problem in Remedial Alternative
b. Physical/chemical: Precipitation/ flocculation and sedimentation	Yes	Proven technology and commonly used treatment process. Has been demonstrated effective for removal of asbestos from water. Laboratory bench-scale or pilot-scale testing required to determine effectiveness and optimum process parameters.	Eliminates risk to public health and environment (Wissahickon Creek) due to off-site migration of asbestos contaminated water. May require polishing step to conform with discharge permit/regulations. By product sludge requires disposal/treatment. Relatively low cost; equipment readily available.	Lagoon surface water
c. Physical: Filtration	Yes	Proven technology and commonly used treatment process. Has been demonstrated effective for removal of asbestos from water. Use as first treatment step may result in rapid clogging of micropore filters. Laboratory bench-scale or pilot-scale testing required to determine effectiveness and optimum process parameters.	Eliminates risk to public health and environment (Wissahickon Creek) due to off-site migration of asbestos contaminated water. May require polishing step to conform with discharge permit/regulations. By product sludge requires disposal/treatment. Relatively low cost; equipment readily available. Backwash or spent filters require disposal/treatment may be effective as polishing step for other treatments.	Lagoon surface water
d. Physical: Evaporation	No	Proven technology for treatment of various municipal and hazardous wastes. Most effective for treatment of wastes with high solids content; lagoon waters may not exhibit desireable characteristics for effective treatment. Data not available to show process demonstrated effective for treatment of wastes similar to those at site. Laboratory bench and pilot scale tests would be required.	Potential risk due to public health from entrainment of fibers in process vapor stream. Waste stream would reqiure further treatment. Permitting not required under SARA; regulatory agency approval required.	Not Recommended

Table 6 (continued)

General Response Action And Associated Remedial Technologies	Retained for Alternative Development	Technical Considerations	Other Considerations	Recommended Application to Site Problem in Remedial Alternative
e. Solidification/stabilization	Yes	Solidification techniques not effective in long term stabilization of asbestos wastes. Weathering of solidified asbestos work can result in future releases. Solidification of calcium carbonate wastes with fly ash would allow for the removal of this waste for partial on-site or off-site disposal.	Stabilization of calcium carbonate waste will allow for removal of this waste and redisposal in a more stabilized pile on-site or off-site	Waste piles
7. Off-Site Treatment technologies discussed under on-site/off-site disposal				
8. Off-Site Disposal	Yes	This technology involves excavation of contaminated materials and transport to approved off-site disposal sites. Commercial RCRA and municipal landfill capacity is limited and high volumes may not be accepted. Potential disposal in municipal landfill with special permitting.	Materials are not treated or destroyed but the threat to the local environment is eliminated by removing the contaminated materials to a secure site. Potential risks to public health associated with removal and transport of the asbestos due to airborne asbestos fibers a RCRA-approved or municipal (with proper permitted) landfill must be used. Applicable U.S. DOT requirements for shipment of waste must be met. Magnesium/calcium carbonate material may need to be stabilized. Potential major ambient air quality risk during remedial action.	Waste piles Lagoon sediments
9. On-Site Disposal	No	This technology involves excavation of contaminated materials followed by disposal in an on-site newly constructed landfill meeting applicable RCRA standards. Incorporates proven techniques and would include surface management and infiltration control. Site characteristics may warrant construction of an aboveground landfill. Implementation is limited because of severe space limitations at the site and high volumes of material.	Favorable impact to public health and environment due to securement of contaminated materials. Regulatory agency approval required. There may be problems due to dust/airborne asbestos from excavation activities. May not meet with public or local agency approval.	Not Recommended

(including monitoring) at a site, to one that would use treatment as a primary component of an alternative to address the principal threats at the site.

Alternatives that involve containment of waste with little or no treatment, but provide protection of human health and the environment by preventing potential exposure and/or by reducing the mobility.

- The alternatives were developed to a level adequate to apply the non-cost and cost evaluation criteria, discussed in further detail later in this section.

The cost-effective alternative is defined as the lowest cost alternative that is technologically feasible and reliable, effectively mitigates or minimizes damage, and provides adequate protection of public, welfare, and the environment (See Section 40 C.F.R. Section 300.68(i) and Section 121(b)(1) of CERCLA). Section 121 of CERCLA, 42 U.S.C. Section 9621, adds that the most cost-effective alternative is one that achieves results that cannot be achieved by less costly methods.

As per CERCLA Section 121 the development of a complete range of treatment alternatives may not be practical in some situations. Alternatives within this range typically will differ in the extent of treatment used and the management requi ments of treatment residual or untreated wastes. For example, for sites such as the Ambler Asbestos Piles site with large volumes of potentially low concentrated wastes, such an alternative screened for their suitability to the site according to environthat eliminates the need for long-term management may not be reasonable given site conditions, the limitations of technologies, and extreme costs that may be involved.

With respect to the Ambler Asbestos Piles site, the remedial action technologies that remain after screening are generally under the source control classification, since on-site controls are the most appropriate to this site.

Remedial action alternatives that have been developed for the Ambler Asbestos Piles site are presented in summarized form in Table 7. For a given alternative, each of the areas of concern are addressed and the associated Alternative types from40 C.F.R. Section 300.68 (f) is identified.

EVALUATION CRITERIA

This subsection describes the criteria used for the evaluation of the developed remedial alternatives. The four remedial action alternatives formulated in Table 7 are evaluated further based on both non-cost and cost criteria.

Table 7

Remedial Action Alternatives for the Ambler Asbestos Site

Remedial Action Alternative	Description of Alternative		Problem Areas Addressed
1. No Action	• Site security improvements and monitoring.	• No action.	• Site security improved.
2. Excavation/Removal – Off-Site Disposal	• Excavation of waste piles and lagoon sediments.	• Disposal at off-site facility.	• Volume reduction to zero (on-site).
	• Pump water from lagoon. Treatment of water.		
	• Disposal at off-site facility.		
3. On-Site Vitrification/ Stabilization	• Construction/operation of on-site processing plant(s).	• Treatment.	• Toxicity and mobility of asbestos contaminants reduced.
	• Pump water from lagoon. Treatment of water.		
	• Excavation of waste piles and lagoon sediments.		
	• Vitrification of asbestos materials (piles and sediments).		
	• Solidification of calcium/ magnesium carbonate materials.		
	• On-site and/or off-site disposal of vitrified/solidified materials.		

Table 7
(continued)

Remedial Action Alternative	Description of Alternative		Problem Areas Addressed
4. On-Site Closure	• Pump water from lagoon. Treatment of water. • Installation of geotextile over lagoon sediments and backfill of the lagoon. • Installation of geotextile and soil cover over exposed asbestos on piles. • Installation of scouring protection along the creek adjacent to the Locust Street Pile. • Upgrade of site security. • Erosion/sedimentation control (for runon and runoff).	• Containment with little or no treatment.	• Mobility of asbestos contaminants reduced.

The objectives and criteria described herein are consistent with Section 121 of CERCLA, 42 U.S.C. Section 9621 40 C.F.R. Section 300.68. The procedures in the NCP are specific for hazardous substance response and are consistent with the requirements of the National Environmental Policy Act (NEPA).

Section 121 of CERCLA, 42 U.S.C. of CERCLA Section 9621 requires that preference be given to remedies that permanently and significantly reduce the mobility, toxicity, or volume of the hazardous substances themselves. In addition, preference is to be given to remedies using alternative treatment technologies. Off-site transport and disposal of hazardous substances without treatment is designated the least favored alternative.

NON-COST CRITERIA

Non-cost criteria are described in detail in the subsections that follow and include:

- Technical Feasibility
- Institutional requirements
- Public health and environmental issues

1. Technical Feasibility - The technical feasibility criteria address critical objectives in the technical evaluation of potential remedial action alternatives. These objectives include performance, reliability, implementation, and safety.

2. Institutional Requirements - These institutional factors are used to evaluate the acceptability of each technology to local, state, and Federal agencies, as well as the potential for compliance with existing or future regulatory policies. As an example of institutional criteria, all on-site actions generally require approved sedimentation and erosion control plans (if major earthwork is to be performed).

3. Public Health and Environmental Issues - The remedial action selected must adequately protect human health and the environment. The remedial alternatives are evaluated for their effectiveness in mitigating the existing or potential contaminant exposure to the public. Documentation that the action adequately controls both the longterm effects to the residual contamination and short-term effects caused by implementation of the remedial action, and protects the public, both during and after the remedial action, is required. Applicable health and environmental health standards are used to evaluate each alternative. The overall goal of the selected remedial action is to mitigate the existing environmental threats without creating additional adverse effects.

COST CRITERIA

According to Section 121 of CERCLA, 42 U.S.C. Section 9621, a remedial cleanup program must be implemented and operated in a cost-effective manner and must mitigate the environmental concerns at the site. Section 121 of CERCLA requires ensuring that the results of a particular alternative cannot be achieved by less costly methods. It implies that there may be more than one cost-effective remedy, with each remedy varying in its environmental, human health, and institutional results. In considering the cost-effectiveness of the various technologies, costs are considered as follows:

- Capital costs
- Operating and maintenance costs
- post-remediation (monitoring) costs.

Monitoring and maintenance operations can represent a substantial portion of a remedial action strategy. Remedial strategies should aim to minimize the added costs for these operations.

The present worth value method (1988 dollars basis) is utilized to evaluate the total cost of a remedial action strategy, including the post-closure period. The cost-effectiveness for the various technologies is compared based on total present worth.

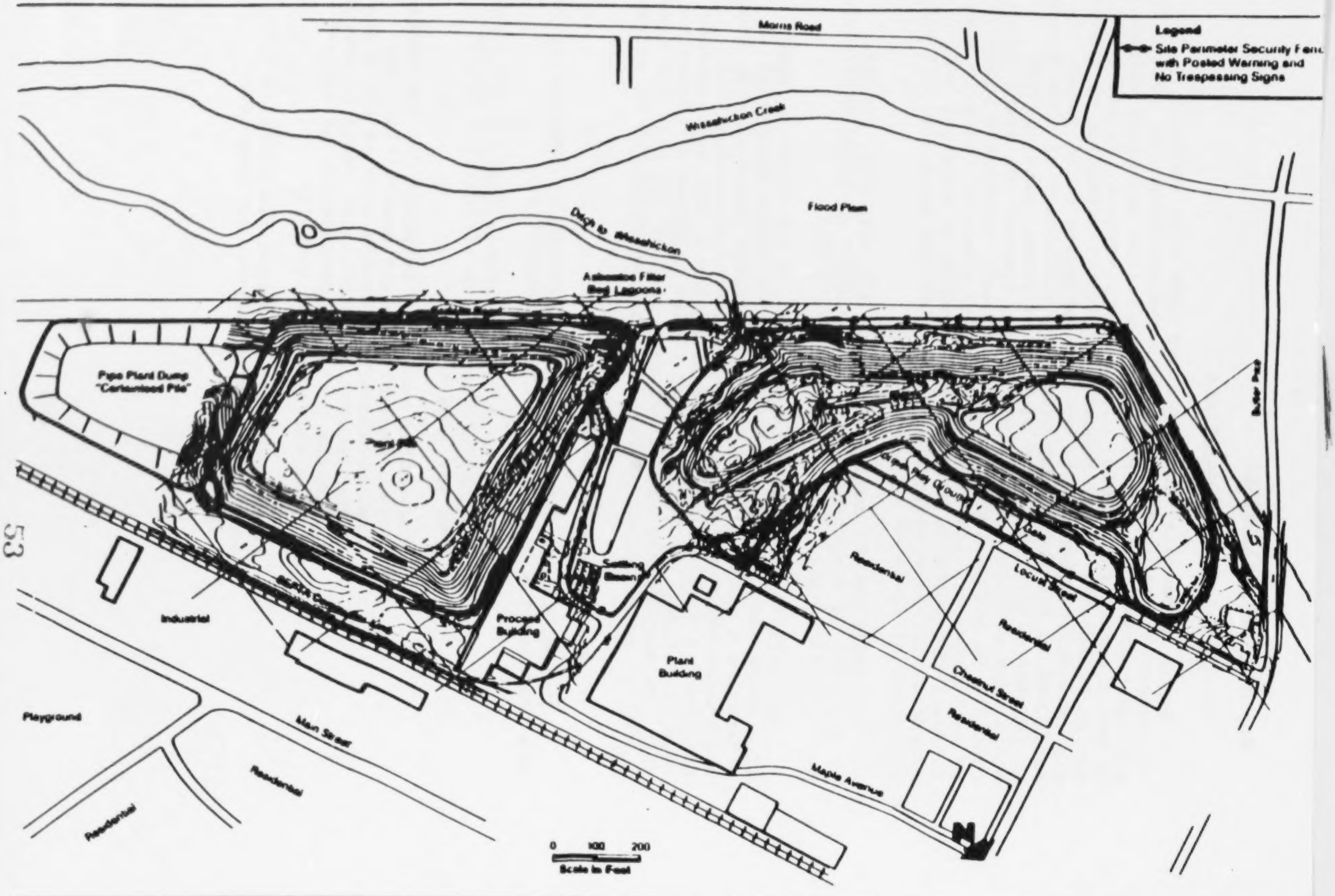
EVALUATION OF ALTERNATIVE 1: NO ACTION WITH SECURITY IMPROVEMENTS AND MONITORING

A. DESCRIPTION

The purpose of evaluating this no action alternative is to provide a basis for comparison of existing site conditions with the other proposed remedial action alternatives. This alternative consists of performing no physical remediation work to the piles or lagoon site area. Security improvements consisting of new fencing, access/egress gates (with locks), and the provision of appropriate warning/informational sign are included in this alternative. These improvements would be designed to meet the current EPA, NESHAPS, and PADER regulations regarding closed solid waste (asbestos-containing) landfills. Figure 10 graphically depicts a logical location of these fencing, gates, and sign improvements.

In addition, visual inspections (biannual for the first five years after implementation) and environmental ambient air monitoring would be performed during the following five years after implementation in order to evaluate whether this action alone adequately protects human health and the environment.

No other improvements or remedial measures would be undertaken under this alternative (see Fig. 10.)



Legend
Site Perimeter Security Fenc
with Posted Warning and
No Trespassing Signs
Morris Road
Wissahickon Creek
Flood Plain
Ditch to Wissahickon
Asbestos Filter
Bed Lagoons
Pipe Plant Dump
"Contaminated Pile"
Settling
Basin
Process
Building
Plant
Building
Industrial
Playground
Main Street
Residential
Residential
Maple Avenue
Residential
Chestnut Street
Residential
Locust Street
Residential
Gate
Play Ground
Boiler Pad
N
0 100 200
Scale in Feet

FIGURE 10 NO ACTION ALTERNATI

B. NON-COST EVALUATION

1. Technical Considerations

Since no remedial actions other than site security improvements, continued inspection, and environmental monitoring are taken under this alternative, a detailed technical evaluation is not directly applicable. In general, however, no affirmative action to prevent direct contact/incidental ingestion or ambient air inhalation exposures to on-site receptors would occur. As mentioned in the technology screening subsection of this document, it is most likely that even with a new fence, gate, posted signs, and warning system, trespassers (mostly children) would continue to access the site. The exposed, noncovered plateaus of both piles and incomplete and eroded areas of the pile side slopes would continue to be a major source of asbestos and potential off-site migration of asbestos and potential off-site migration of asbestos if disturbed.

In addition, no action to reduce the toxicity, volume, or mobility of the contaminants would occur as stipulated within Section 121 of CERCLA, 42 U.S.C. Section 9621.

No affirmative action toward meeting the chemical specific ARARs nor the action specific State ARARs identified in Altenative 4 would occur. In time, surface water quality from eroded/uncovered pile areas and the lagoon discharge would continue to worsen with no provisions for future maintenance/ repairs. Also, the potential of future releases of asbestos into the ambient air if the exposed areas of the pile are disturbed or cover failure/ erosion continues would not be addresse

2. Institutional Considerations

The following institutional/administrative considerations are associated with this no action alternative:

- Ability to obtain approvals from other agencies is doubtful based on no affirmative action over the long-term.
- Unfavorable community response (by residents of Ambler Borough, adjacent communities, and local environmental groups such as the Wissahickon Watershed Association) would be expected due to the projected degradation of ambient air and surface water quality.
- Compliance with site-specific ARARs is not addressed over the short- or long-term.

3. Human Health and Environmental Considerations

This no action alternative, as previously described, includes site security and warning sign improvements. These measures would serve to make access to the piles and lagoon areas more difficult to unauthorized personnel, and thereby reduce to some degree the present and future risks via direct contact/ incidental ingestion and inhalation of ambient air exposures to on-site receptors. It could be realistically expected, however, that based on historical accounts, some trespassers would access the site area and locations of exposed asbestos.

The site is currently partially fenced-in and warning signs are posted in some areas, although these structures are not continuous or prominent, and are generally in bad repair. Also, the gates are not continually locked.

Compliance with chemical-specific ARARs would also not be provided relative to on- and off-site surface water quality and ambient air asbestos fiber concentrations.

In addition, although visual and environmental monitoring would be provided for, the results of these activities appear to be a "faitaccompli" in that without maintenance and repair, the existing soil cap will most likely continue to fail at localized side slope areas of the piles; thereby exposing more asbestos to the environment. In this regard, no reduction in future risks to on- or offsite receptors is provided for, and in actuality, the situation/risks would worsen (particularly for off-site receptors). No increase in long-term reliability is provided for via this alternative.

It is further expected that although no current unacceptable risks to off-site receptors resulting exclusively from this site can be quantified (due to other existing potential asbestos sources in the area), the situation would worsen with time until either these other sources are remediated. Releases from this site would increase to the degree where numerical degradation of air and surface water quality would be quantifiable, and directly related to this site.

In summary, the non-cost-related considerations and feasibility for long-term effectiveness of this alternative are not favorable.

C. COST EVALUATION

Capital costs associated with this alternative include fencing to enclose the site, installation of gates and locks, and warning signs on the fences. The total capital cost for Alternative 1, presented in Appendix A, Table 8 is estimated at $165,000.

Operating and Maintenance (O&M) costs are estimated at $23,400/yr, as shown in Appendix A, Table 9. These costs are incurred during long-term monitoring for asbestos and maintenance of the facility. A summary of the total costs and the present worth analysis of each alternative are presented in Appendix A.

EVALUATION OF ALTERNATIVE 2: EXCAVATION/REMOVAL - OFF-SITE DISPOSAL

A. DESCRIPTION

This alternative consists of complete excavation and removal of the Locust Street Pile, Plant Pile, and Lagoon areas waste materials to an off-site permitted/approved landfill.

The general major components of this alternative are shown in Figure 11 and would include:

Piles

- Diversion of runon and construction of runoff containment/ treatment facilities;
- Complete excavation of the waste materials (asbestos wetting and/or dewatering as applicable, as well as calcium/magnesium carbonate dewatering) - Level C protective measures would be required for remedial activity for approximately 50 percent of the time;
- Continuous air and surface water monitoring;
- Bagging of asbestos wastes, physical conditioning/ solidification of interior wastes prior to loading and transport to an approved facility;
- Transport equipment decontamination prior to site egress;
- Soils testing for verification of cleanup criteria;
- Hauling clean soil fill and fill/regrade the site for positive drainage;
- Revegetate.

Lagoon

- Diversion of runon and collection of runoff;
- Pump down and treatment surface water contents in lagoon (estimated at 1.9 million gallons);

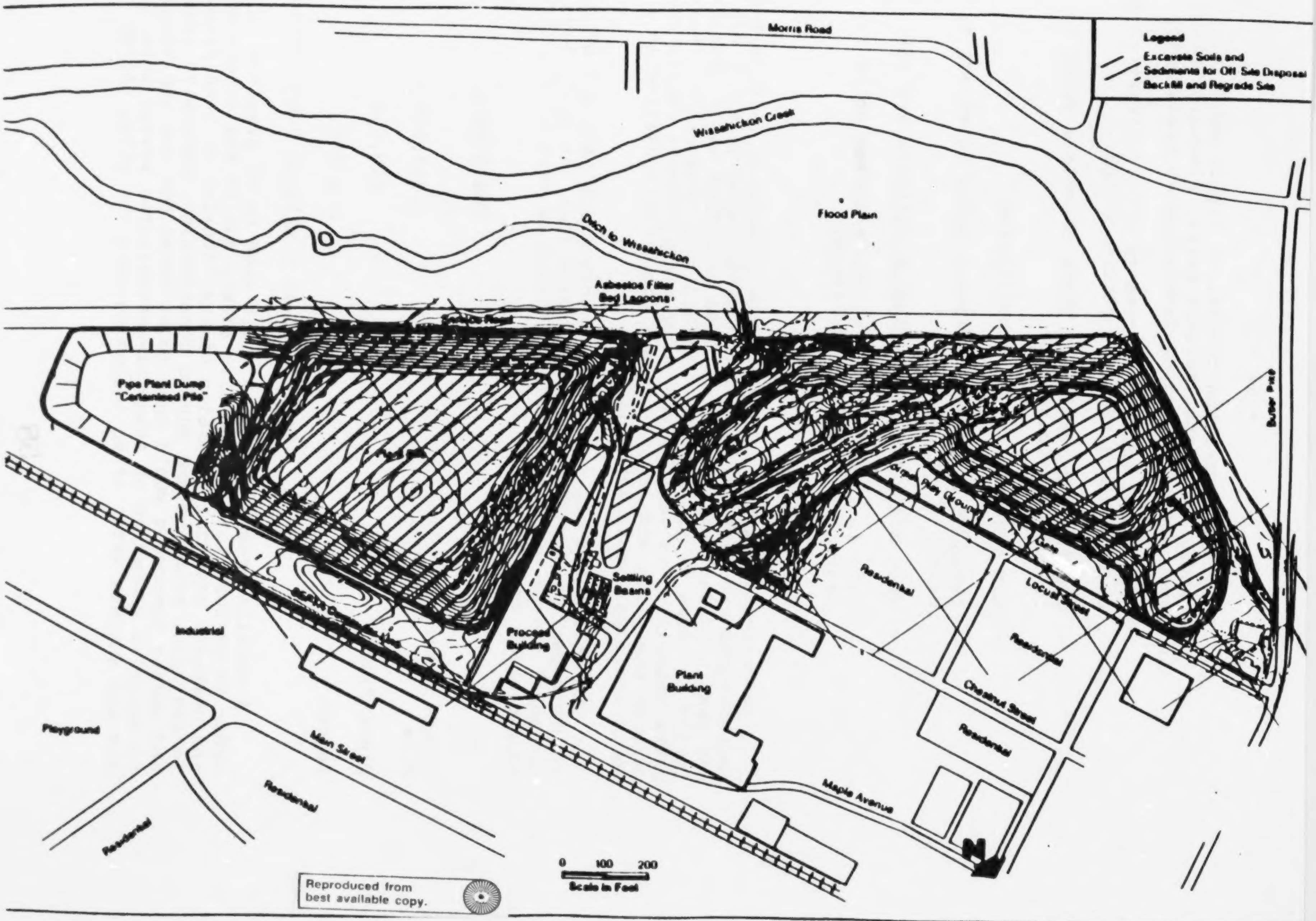

Morris Road
Legend
Excavate Soils and Sediments for Off Site Disposal
Backfill and Regrade Site
Wissahickon Creek
Flood Plain
Ditch to Wissahickon
Asbestos Filter Bed Lagoons
Pipe Plant Dump "Contaminated Pile"
Butler Pike
Play Ground
Locust Street
Residential
Residential
Chestnut Street
Residential
Maple Avenue
Settling Basins
Process Building
Plant Building
Industrial
Playground
Main Street
Residential
Residential
N
0
100
200
Scale in Feet

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FIGURE 11 ALTERNATIVE 2 - OFF-SITE DISPO

- Complete excavation/removal of lagoon materials (sands, sediments, ballast berms, discharge structure, etc.), including dewatering as applicable;
- Repair and restrict access to stone culvert adjacent to lagoon and restrict future access;
- Bagging and loading of waste materials prior to loading and transport;
- Air and surface water monitoring.
- Decon of transport equipment prior to egress from the site;
- Test soils to verify cleanup criteria are met;
- Fill in lagoon area with clean borrow soils and regrade for positive drainage;
- Revegetate.

EP Toxicity tests performed on the underlying calcium/magnesium carbonate waste materials and cinder/slag material did not result in leachates that exhibited hazardous waste characteristics in terms of EP toxicity. Within this assumption, these waste materials, as well as the other miscellaneous debris that make up the piles and lagoon wastes, could be landfilled in a solid/municipal waste landfill.

The results of the geotechnical boring and test pit sampling programs performed during the RI indicate that the quantities (in cubic yards) waste materials contained in each of the three source areas on-site are as follows:

	Waste total
Locust Street Pile	615,000
Plant Pile	640,000
Lagoon	4,500

Total = 1.26 ± million cubic yards

A detailed remedial design would need to be prepared in order to perform this alternative safely due to the saturated and unstable physical condition of the interior of both piles. In addition, prior to and during construction, extensive health and safety protocols would need to be developed and implemented to minimize migration of asbestos-contaminated wastes into the air and surface water after intruding into the piles and/or lagoon. Also, it would have to be determined where these wastes would and/or could be taken for off-site landfilling due to the massive quantity involved. These considerations are discussed/ evaluated later in this subsection.

B. NON-COST EVALUATION

1. Technical Considerations

This alternative would involve very extensive remedial design and preconstruction planning work. It appears this alternative could be feasible from a strictly technical viewpoint; however, it would be a massive construction undertaking (particularly from geotechnical and construction safety points of view) and would span over many years. The major advantage to this alternative is that the waste materials would be completely removed, thereby reducing to the greatest degree possible the permanent remedy with reference to this site (although the wastes would be deposited elsewhere with the same volume and toxicity characteristics). If solidification/stabilization of the calcium/ magnesium carbonate material was performed prior to hauling off-site, the final volume may actually be greater.

Another advantage is that future monitoring/maintenance of the site to ensure long-term integrity would not be required.

The constructability of this alternative is somewhat questionable at this time. Additional geotechnical testing and stability analysis would need to be performed to evaluate the stability of the piles, as portions of the piles were removed for off-site disposal. Of greatest concern is the stability of the calcium carbonate waste contained by the cinder, slag, and solid asbestos waste berms. In many portions of the piles, where the calcium carbonate is nearly or totally saturated, the bearing strength of this material is too low to support its own weight and acts as a viscous fluid. This means that the asbestos-contaminated cinder and slag berms material could not be removed in one phase or the interior of the piles would slump, creep, or even collapse suddenly upon removal of its existing lateral support.

Obviously this condition would be very dangerous to construction workers and others who may enter the site. Also, these waste materials would tend to slump down and consume more ground space, which is generally not available, particularly adjacent to the creek, existing structures, and possibly even the commuter rail line. This condition would get even worse during precipitation events.

Accordingly, construction would need to proceed in phases from the middle-top of each pile and down toward the existing ground surface. It is believed that even under this mode of operation, the heavy equipment required could not be supported by the pile materials. Localized puncture shear failures would occur without first stabilizing the material, as was performed during the field investigation to access the drill rig. The piles may not be able to support large construction equipment, resulting in potential deep circular or other type failure of the side slopes. The slope stability analysis of the piles indicates the piles could support light- to medium size equipment. Physical safety would be a major concern. Runoff quality would be very poor, requiring treatment prior to discharge from a chemical, pH, and total suspended solids loading point of view. Due to the heterogeneous nature and age of the piles, it also would not be known what other types and/or sizes of foreign objects may be encountered inside the piles. Extensive dewatering and treatment of the decant liquids would also be required. Solidification via admixture of dry materials would likely be necessary in order to make this material both transportable and landfillable. Without providing some degree of solidification, transport off-site may be a very "sloppy" operation. Spills and leakage would be expected enroute to the designated new landfill(s).

Removal of the asbestos process waste and the asbestos contaminated slag and cinder berm materials presents several problems that would also exist during remedial action. The two most prevalent of these would likely be releases of asbestos fibers to the ambient air and surface water during excavation and loading and transport, along with the need to "double-bag" these materials per current regulations for transport and disposal of asbestos. A mechanical system would likely need to be designed and constructed to accomplish this without extensive handwork that could result in direct contact and potential inhalation of asbestos fibers by workers. Even with this type of system, maintenance would be required, foreign objects would likely upset the mechanical operation, and cleanup of spillage would be required.

It could be argued that by wetting down the exposed asbestos wastes, acute releases could be controlled. However, it was noted during the RI drilling program that the surface of exposed materials can dry out during prolonged hot and windy conditions. Realistically, it is believed that migration of asbestos fibers into the air could occur during weekends, holidays, shut-down periods, and potential periods of worker inefficiency during the wetting operation. Extensive monitoring would be required on an almost continual basis.

Full-time supervision and inspection by OSHA and/or other agencies would likely be required. Extensive transport vehicles, decontamination, and site security policies would be needed to ensure that asbestos is not racked/spilled offsite in Ambler Borough, adjoining communities, and enroute to the receiving landfill(s).

As a rough estimate, at a rate of 40 truckloads per day (one truck-load leaving the site each 15 minutes for a duration of 10 hours per day); a five-day work week; and 20 cubic yards per truck; it would take approximately 6 years of continuous operation to remove 1.26 million cubic yards.

The contaminated lagoon sediments consist mainly of sand and soil, with varying quantities of asbestos fibers present. These sediments are located beneath an estimated one-half to ten feet of water currently in the lagoon. The sediments and other contaminated media would be removed to a depth where sampling and testing indicated that the cleanup criteria for asbestos-contaminated material had been met. For this reason, the quantity of material to be removed is very difficult to estimate. Assuming a three-foot layer of contaminated sediment on the bottom, and when adding the volume of contaminated adjacent surface soils and the ballast/slag beams that were apparently installed to filter the effluent prior to discharge, the projected approximate quantity of asbestos-contaminated media is 9, 600 cubic yards.

Excavating the sediment from the lagoon would require that it be drained or pumped out first, followed by the use of a clam shell crane or dredger. Excavation would begin at approximately 10 feet below grade and extend to an undetermined depth. Such an operation would proceed very slowly and would present risks to on-site workers.

In summary, the technical feasibility of the alternative is not favorable for the various reasons discussed above.

Institutional Considerations

The availability of landfill space in the somewhat local area is also a realistic concern with this alternative. Municipal/solid waste landfill capacity in the areas surrounding this site (Pennsylvania, New Jersey, Delaware, Maryland areas) is not abundant. Also, many of the landfills that do have capacity are not currently permitted to accept asbestos wastes. Problems also exist with transporting and landfilling wastes to out of state locations, which further realistically limits available sites for disposal.

According to conversations with PADER, the landfills that are currently permitted to receive asbestos-contaminated wastes (classified as "special handling municipal waste") in the eastern Pennsylvania area include:

- Grand Central Landfill - Located in Plainfield Township, North Hampton County, Pennsylvania. The projected capacity is 840,000 cubic yards (provided by operator), which is planned to be filled with other solid waste over the next two years. The distance from Ambler is approximately 50 miles.

- Pottstown Landfill - Located in Pottstown, Montgomery County, Pennsylvania. The remaining existing capacitv is 2,000,000 cubic yards (plus or minus). The exist time frame expected to fill this space with other solid waste is approximately 2 years. It is located approximately 40 miles from Ambler.

- Empire Sanitary Landfill - Located in Taylor Borough, Lackawana County, Pennsylvania. It is located approximately 100 miles from Ambler. Available remaining capacity was not available.

In addition to potential lack of available landfill capacity, it would take a multidisciplinary remedial action contractor (and likely an array of subcontractors) with substantial technical, financial, and manpower resources to undertake a project of this nature. These type of firms do exist, but are not abundant.

Other institutional considerations involved with this alternative include:

- Potential delays, coordination problems, and/or disapproval by other involved agencies (state, county, and local) due to various factors.

- A likelihood of objections by the local citizens in Ambler communities, communities enroute to the recei ing landfill, and particularly the receiving communi due to risks involved with releases of asbestos to ambient air and environmental media the result of major intrusions into the piles, transport problems, and potential releases at the receiving facility.

Compliance with ambient air, surface water, and occupational requirements may also be difficult to achieve during remedial action under this alternative.

In summary, although some citizens and officials in Ambler Borough would likely favor the long-term advantage of removing the piles from the borough and "reclaiming" this land, the overall institutional feasibility of this alternative is not favorable. (See Section 121(b)(2) of CERCLA, 42 U.S.C. Section 9621(b)(2)).

3. Public Health and Environmental Considerations

A long-term, post-remedial reduction in future risks to on-and off-site receptors on and around this site could be accomplished through implementation of this alternative. Long term compliance with sitespecific ARARs and elimination of future inspection and maintenance could also be accomplished through this alternative.

As discussed in the previous subsections, however, the excavation of these materials could likely cause increased releases of asbestos fibers into the ambient air and surface waters. The health risks to workers, the adjacent community, and environment posed by these releases have the potential to be substantial and could be prevented with another alternative that did not entail excavation or major disturbance of these materials.

This alternative would entail significant potential health and safety risks to workers, including direct contact with great quantities of asbestos-laden materials and physical safety hazards associated with the potentially unstable piles if major intrusive activities were performed.

Over the "short term" (during remedial action), increases to existing risks are assured should this alternative be selected. Also, as previously discussed, the length of time involved to remediate the site under this alternative is substantial.

In summary, the feasibility of this alternative with respect to human health and environmental considerations has some advantages over the long-term. However, the substantial potential for increased risks to on-site and offsite receptors during remedial action appears to outweigh the long-term advantages.

C. COST EVALUATION:

The capital cost for alternative 2 is estimated at $2,446,000, as presented in Appendix A, Table 10. Operating and maintenance (O&M) costs are provided in Appendix A, Table 11. The O&M costs have been estimated at $30,828,000 for the first seven years during remedial activities and $2,800 for five years after remediation. Post-remediation costs involve monitoring activities to verify effective cleanup.

EVALUATION OF ALTERNATIVE 3: ON-SITE VITRIFICATION/STABILIZATION (VIA PROCESSING PLANT(S))

A. DESCRIPTION:

This alternative would involve further pilot-scale development and analysis, and potential future construction of a full-scale vitrification and/or vitrification and stabilization plant(s) on the site.

Vitrification is a process wherein asbestos-contaminated materials can be transformed by melting (at extremely high temperatures (1,300.F)) into a nontoxic glass-like material.

This process differs from the technology referred to typically as "in situ vitrification", which melts the contaminated material through probes driven into the contaminated material. Consequently, this process requires excavation of the asbestos contaminated materials, hauling to the plant, and fed into the furnace structure. Electric power construction requirements for the vitrification process, based on reported data (supplied by vendors), would be very large (estimated at 1,000 kw per 1 ton of asbestos waste processed). A new electric substation would likely need to be constructed on or near the site, or substantial revisions to the existing facilities and major service lines than run into the site.

Vitrification in both of these forms has been, and continues to be, an application of interest to regulatory agencies, including EPA; and is most accurately described in its current state of development as an "innovative technology." EPA has/is currently evaluating these processes as part of its Superfund Innovative Technologies (SITE) program. At least one "demonstration project" regarding vitrification via the processing plant type of operation has been performed in the recent past. EPA and REM II personnel visited a pilot plant version of this process at a former glass works in Martinsburg, West Virginia, on June 29, 1987, to investigate this technology's potential applicability for use at the Ambler Asbestos Piles site. A "trial burn" using bagged asbestos material from abatement projects was run through this plant; which was developed, constructed, and operated by "Vitrifix of North America, Inc." Relatively small quantities (with relation to the volume of asbestos-contaminated materials that would require processing at the subject site of this RI/FS) appeared to have been successfully transformed into glass type end products during this demonstration.

At the time of the pilot plant visit, only 1 ton/hour of asbestos material was being processed with plans to increase feed rates to 5-6 tons/ hour. These materials generally contained a higher average asbestos content (45 percent asbestos) than expected from the pile wastes and lagoon sediments that would require processing at this site. The "feedstock" was noted to consist mostly of previous bagged asbestos abatement types of wastes (from building and factory cleanups); although some lower content asbestoscontaminated materials were also processed. The process also requires the addition of soda lime-based glass (or other source of sodium ions for use as an electrolyte) to maintain the electric current across the electrodes that melt the asbestos wastes. Normally 20 percent of the feedstock is glass (cullet).

From the work performed and results published to date, the processing plant type of vitrification appears to be a viable and potentially promising technology for asbestos transformation and detoxification at certain types of sites and waste streams. To our knowledge, however, no fullscale, extended runs have been performed to date that limit current ability to totally evaluate the technical, operational, and cost related variables of this technology over the long-term.

At this time, several vendors are apparently working on variations of this technology for potential large-scale application to sites of various types. Vitrifix of North America, Inc. previously submitted a method statement (November 1986) for applicability of their process to the Nicolet Plant Pile Wastes which was evaluated by EPA.

With regard to the Ambler Asbestos Piles site, this technology appears most applicable to the asbestos-contaminated materials from both piles and the lagoon sediments.

It is technically possible that this type of process can include the calcium/magnesium carbonate wastes as part of the cullet feedstock if sand is also added. Although the quantity of calcium carbonate in the piles far exceeds the volume that could be processed based on an 80 percent asbestos/20 percent cullet feedstock ratio.

Regarding these internal materials, it is also possible and potentially more practical to stabilize the magnesium/calcium carbonate wastes via pozzolanic, cement-kiln dust (CKD) and/or thermoplastic solidification/stabilization methods (although no bench- or pilot-scale studies have been performed to our knowledge on these materials in this regard). These technologies have been utilized on various other types of projects, however; with same degree of success.

In simplified form, the major components and sequence of construction for Alternative 3 are shown in Figure 12 and are as follows:

- Research, test, analyze, and further develop the potential vitrification and/or stabilization technologies on a bench-scale, to a greater degree with site-specific materials leading toward possible approval of certain pilot- and full-scale systems to "treat" on-site the waste materials at this site (treatability studies).
- Construct full-scale on-site facility(ies). Many significant feasibility variables such as location and space requirements; electric and other utility services; financial and liability agreements; environmental emissions and discharge limitations; health and safety protocols; etc., would need to be worked out prior to start of construction.
- Excavate, haul, and stockpile waste materials from both piles and the lagoon in a sequenced manner (over a number of years) in order to provide the feed materials to the plant(s). Site preparation (runon diversion, runoff control, haul roads, etc.) similar to those previously described under Alternative 2 -

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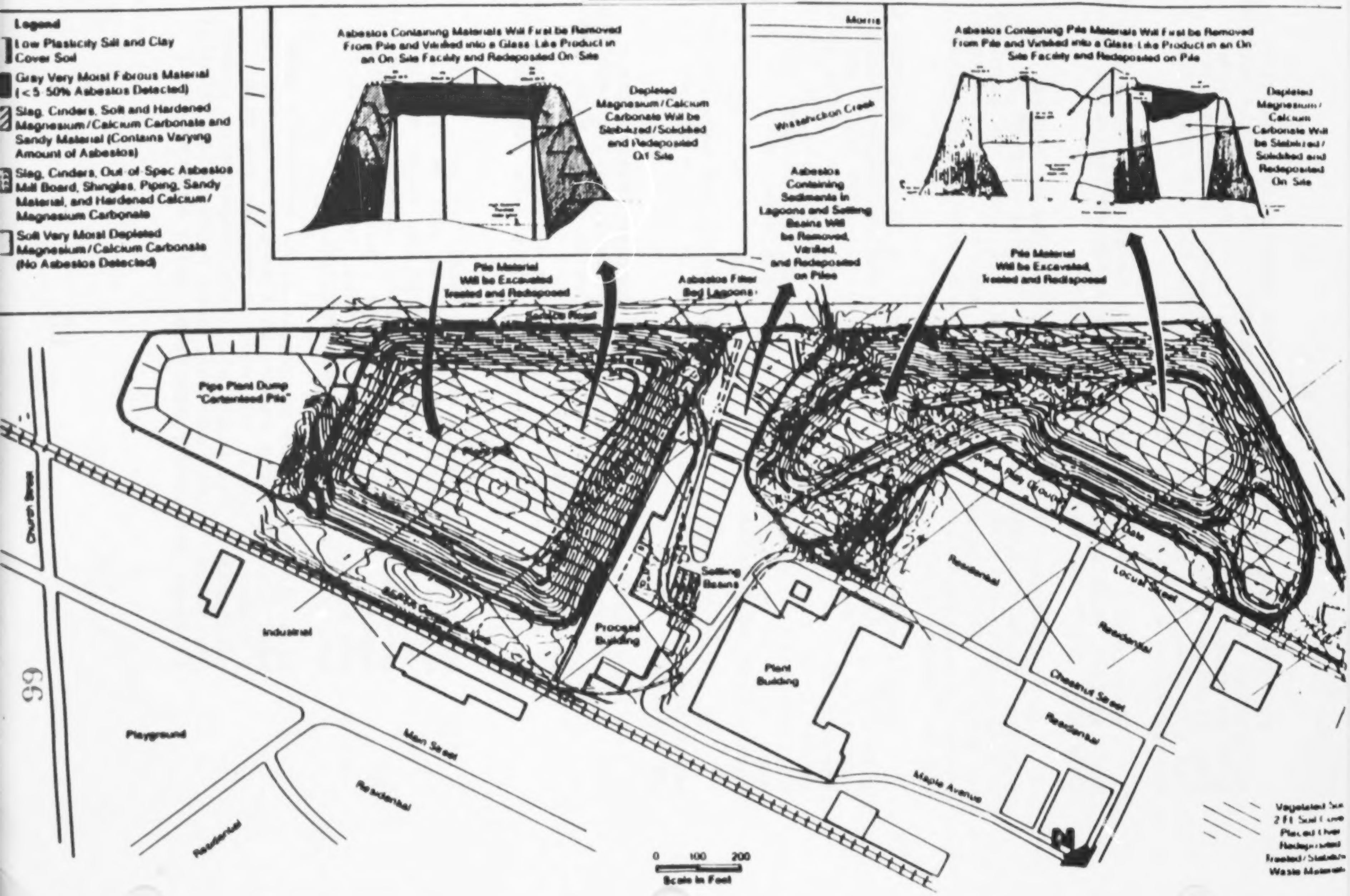
Legend
Low Plasticity Silt and Clay Cover Soil
Gray Very Moist Fibrous Material (<5-50% Asbestos Detected)
Slag, Cinders, Soft and Hardened Magnesium/Calcium Carbonate and Sandy Material (Contains Varying Amount of Asbestos)
Slag, Cinders, Out-of-Spec Asbestos Mill Board, Shingles, Piping, Sandy Material, and Hardened Calcium/Magnesium Carbonate
Soft Very Moist Depleted Magnesium/Calcium Carbonate (No Asbestos Detected)
Asbestos Containing Materials Will First be Removed From Pile and Vitrified into a Glass Like Product in an On Site Facility and Redeposited On Site
Depleted Magnesium/Calcium Carbonate Will be Stabilized/Solidified and Redeposited On Site
Morris
Wissahickon Creek
Asbestos Containing Pile Materials Will First be Removed From Pile and Vitrified into a Glass Like Product in an On Site Facility and Redeposited on Pile
Depleted Magnesium/Calcium Carbonate Will be Stabilized/Solidified and Redeposited On Site
Pile Material Will be Excavated, Treated and Redeposed
Asbestos Filter Bed Lagoons
Asbestos Containing Sediments In Lagoons and Settling Basins Will be Removed, Vitrified, and Redeposited on Piles
Pile Material Will be Excavated, Treated and Redeposed
Service Road
Pipe Plant Dump "Cartonized Pile"
Church Street
Industrial
Process Building
Settling Basins
Plant Building
Residential
Locust Street
Residential
Chestnut Street
Residential
Playground
Main Street
Residential
Residential
Maple Avenue
N
0 100 200
Scale in Feet
Vegetated So
2 Ft Soil Cove
Placed Over
Redeposited
Treated / Stabiliz
Waste Material

FIGURE 12 ALTERNATIVE 3 - ON SITE

Excavation and Removal, would need to be employed first. Substantial constructability and health and safety concerns (releases of contaminants to ambient air) would need to be addressed first, as previously discussed.

- A "set-aside area" would have to be constructed to deal with large and/or foreign materials that could not be fed into the plant. These materials would likely ultimately require landfilling either on- or off-site.
- Extensive environmental and personnel monitoring for workers and off-site receptors would be required in order to quantify potential releases and the impacts on the local ambient air. Even with required wetting and other dust/fiber suppression controls, unacceptable releases may occur as a result of excavation and process activities requiring a completely enclosed, "bubble canopy" work area. Even with these types of systems, exhausts and emissions are imminent and problems with current applications in other industries are well-documented.
- At best, the process would most likely require substantial modifications and/or additions as the project continued in order to deal with new data and the waste materials types/consistencies encountered during excavation.
- Assuming that the estimated 1.26 million cubic yards could be processed and/or segregated (and portions landfilled), it is not currently known what could/would be done with the final product. According to vendors, although there are certain potential useful purposes for the final product materials (i.e., roadbase materials, structural fill, landfill intermediate cover, etc.), to our knowledge no current reuses of these materials on a large-scale have been documented; not to mention post-reuse monitoring/evaluation of final product properties. With the current information available, it appears very likely that the great majority of these end-product materials would have to be relandfilled, either back on-site in the form of "new-piles" or transported off-site to an approved location for filling.
- At the completion of processing operations the plants(s) would need to be dismantled and removed unless a continued use for them could be found.
- The site would be backfilled and regraded for positive drainage, and revegetated. If materials are redeposited on-site, the material would be covered

with a soil cover of a two-foot thickness. The cover would be vegetated and graded for positive drainage. It is not known at this time what volume reductions of waste materials could be expected using the vitrification process. Stabilization of the magnesium/calcium carbonate would result in an increase in waste volume. Space constraints and slope requirements may limit on-site redisposal.

In general, this alternative would involve extensive predesign/ implementation pilot studies and construction of facility safety and support systems. Because this treatment technology is not a proven technique for large volumes of wastes containing variable concentrations of asbestos, it can be estimated that it would take several years before the feasibility of this technique is proven. Assuming that the technologies could be developed and would prove feasible and effective, it would provide a potential for a permanent remedial solution for this site. However, the potential short-term health risks associated with the excavation and processing of asbestos material presents a considerable risk to local residences. Further discussion of technical, institutional, public health, and cost considerations are provided in the following sections.

B. NON-COST ANALYSIS

1. Technical Considerations

From a purely theoretical point of view, the vitrification/ stabilization process represents a technology that could offer many advantages toward permanent remediation of this site. The vitrification process has recently been recognized by EPA as a means of transforming asbestos into a less toxic form through "destruction" of asbestos fiber structure on a microscopic basis. In this way, the process is capable of reducing the toxicity and in certain ways the mobility of asbestos contaminants over a long-range basis. In relation to this site, however, several major and realistics technical limitations are involved; some have been described in greater detail earlier in this document as follows:

- The process itself has not truly been proven on a full-scale basis for application on a site such as Ambler. Asbestos Design requirements, construction technologies, operational problems, and site-specific considerations are at this time left undefined by the Vitrifix Company.
- The constructability of the excavation of the piles is a major concern and could prove to be not infeasible under under further study due to the problems and potential physical and chemical (asbestos) dangers that exist, as related to removing the asbestos-contaminated outer

materials and having to deal with the saturated and almost negligible shear strength of the underlying interior calcium/magnesium carbonate wastes (which compromise the majority of the interior of the piles, as previously discussed).

- During the period of remediation, it is likely that many ARARs regarding ambient air and/or surface water quality would not be met.

- It does not appear that the vitrification process is intended for or best-suited to "treat" the interior pile materials. In this case, an additional stabilization process (pozzolanic or thermoplastic techniques, each of which are also currently untested with respect to this site), would likely be determined to be required. The methods, although possessing great advantages in their own regard, are generally classified as more encapsulative than destructive technologies; offering potentially less long-term reduction in toxicity and mobility. Also, under these techniques the volume of the final waste product to be dealt with in actuality increases through the addition of solid and reactive ingredients, certain of which possess their own leachable constituents that can affect other environmental media. If a ratio of one-half to one mixing (additive rate) is assumed as being required in order to bulk-up and increase the shear strength of the internal pile materials; and further, if this mixing ratio was proven to be required (in order to allow construction of more stable slope configurations, etc.) an increase of approximately 33 percent would occur in the final volume of resultant stabilized waste materials.

- This technology may result in contructing new piles of even higher elevation than those that exist, and it is not likely that this site could contain this increased volume, necessitating transport and landfilling off-site (unless an alternate reuse could be found).

- Regarding reuse potential for both potentially vitrified and/or stabilized wastes from this site, it is not known of any that currently and feasibly exist on such a large-scale basis. To our knowledge, no major local DOT agencies or others have endorsed largescale reuse of these products under their construction programs. Although these potential reuse options have merit for certain sites and specific waste streams, it is not believed that they are realistically feasible for this site at this time. At best, this alternative would involve years of pilot-scale testing before becoming potentially suitable and proven for use in such a large-scale project.

In summary, the technical feasibility of this alternative does not appear to be favorable.

2. Institutional Considerations

Regarding institutional and associated considerations, the following analysis is provided:

- Because no reuse mechanism for either the vitrified and/or stabilized materials is currently known of or envisioned in the near future for such a large-scale application, it is most likely that off-site landfilling at an approved landfill would at least partially be required (even if some percentage of the materials were relandfilled on-site to a more stable configuration after processing). As previously discussed, a potential shortage of currently projected landfill capacity for the regions around this site has already been evidenced, and is a recognized substantial problem; even without consideration of the relocation of extremely large volumes of waste material present at this site. Processing likely requires near "around-the clock" operation due to the major hardware investments and components to be developed near the plant to feed it. This would create even more potential source areas for migration of waste constituents (particularly asbestos to the air). Public reaction to this situation can be projected to be unfavorable due to exposure risks to off-site receptors.

- As previously discussed, transport safety concerns and the high potential for community disapproval of hauling wastes off-site would most likely exist.

- CERCLA (October 1987) states that certain sites may not be realistically suitable for application of treatment technologies. A portion of this subsection is included below for direct reference, as follows:

  "The use of treatment technologies may not be practicable at some sites with large volumes of potentially low concentrated wastes (e.g., large municipal landfills or mining sites). Remedies involving treatment at such sites may be extremely expensive or difficult to implement."

- Over the long-term (after remedial action), assuming that this alternative could become technically and institutionally feasible (which appears remote at this time), the sources of asbestos on-site would be greatly, if not almost entirely removed, except for residuals left on-site. In theory, this occurrence would seem to be advantageous. However, when considering the potential for substantial emissions/ discharges to off-site areas during a longterm and extensive remediation project such as would result from this alternative, it is believed that the asbestos that could potentially migrate off-site in this time frame would continue to impact the surrounding area (via residual contamination to ambient air and surface water) for a period beyond the remedial action itself. It is possible that the amount of asbestos that could leave the site via these pathways may be more than what would leave the site over the long-term, even if no remediation at all beyond the current status was attempted.

In summary, the public health and environmental feasibility of this alternative is not favorable.

C. COST ANALYSIS:

The preliminary capital cost of Alternative 3: On-Site Solidification/Vitrification, is estimated at $99,376,000, as presented in Appendix A, Table 12. O&M costs are provided in Table 13. It is assumed that, using the vitrification treatment process, it will take 20 years to complete remediation of the site. Some costs estimated for this alternative are speculative due to the technical uncertainties that are associated with some of the components of the alternative. Post-remediation monitoring would be required; however, these costs have not been included in this estimate cause of the uncertainties associated with the length of time for completion to the vitrification treatment process and the relative low magnitude of monitoring costs compared to the remediation costs of this alternative.

EVALUATION OF ALTERNATIVE 4: ON-SITE CLOSURE

A. DESCRIPTION:

Alternative 4 involves placement of a cover system on each of the asbestos-containing waste piles and clean fill in the existing lagoon and settling basins. The major components of this alternative involve the following:

- Pumping of water from the lagoon and settling basins, followed by filtration for removal of asbestos fibers. Discharge of the treated water on-site. Placement of filter backwash on the waste piles;
- Installation of a geotextile over the lagoon and settling basins with clean, low permeability compacted soil (bringing the depression up to grade to promote long-term positive drainage);

- Backfill of the lagoon and settling basins with clean low permeability compacted soil (bringing the depression up to grade to promote long-term positive drainage);
- Installation of geotextile and soil cover for the top of the Locust Street and Plant Piles;
- Repair of erosion on waste pile side slopes due to storm events, soil creep, freeze/thaw effects, etc;
- Installation of gabions or Rip-Rap for protection of the Locust Street Pile from the scouring action of the Wissahickon Creek;
- Installation of fencing/locking gates to prevent unauthorized access to the site and, posting of warning signs;
- Erosion/sedimentation controls during remedial activities and until vegetation establishes;
- Air monitoring for asbestos during remedial activities (personnel and environmental);
- Post-closure inspections, maintenance of the piles, lagoon, and settling basin areas, and preparation of a contingency plan.

Figure 13 provides a graphic illustration of Alternative 4.

Implementing this alternative would first involve pumping the water from the lagoon and settling basins and leaving the sediments in place. A geotextile cover over the sediments (immediately after draining to prevent drying and wind dispersion) would be installed, followed by backfill with clean compacted soil. The backfill and geotextile cover would protect the buried asbestos fibers from freeze/thaw weathering and impede their potential resurfacing.

Since previous laboratory analyses showed that the lagoon and settling basin waters contain asbestos fibers, they must be treated before being discharged onsite. This treatment would include flocculation, followed by a mixed media filter in series with a microfilter to separate the suspended sediment and asbestos fibers from the water. The treated water could then be discharged on-site. The status of the current site NPDES permit would need to be checked and reapproved by the Commonwealth of Pennsylvania prior to discharge. Collected sediment and asbestos would be placed on the piles prior to cap construction.

It has been documented that asbestos fibers do not exhibit migration potential through underlying soils into the groundwater (U.S. EPA, Dalton, D., 1985). Therefore, infiltration and leachate control are not a primary concern at this site.

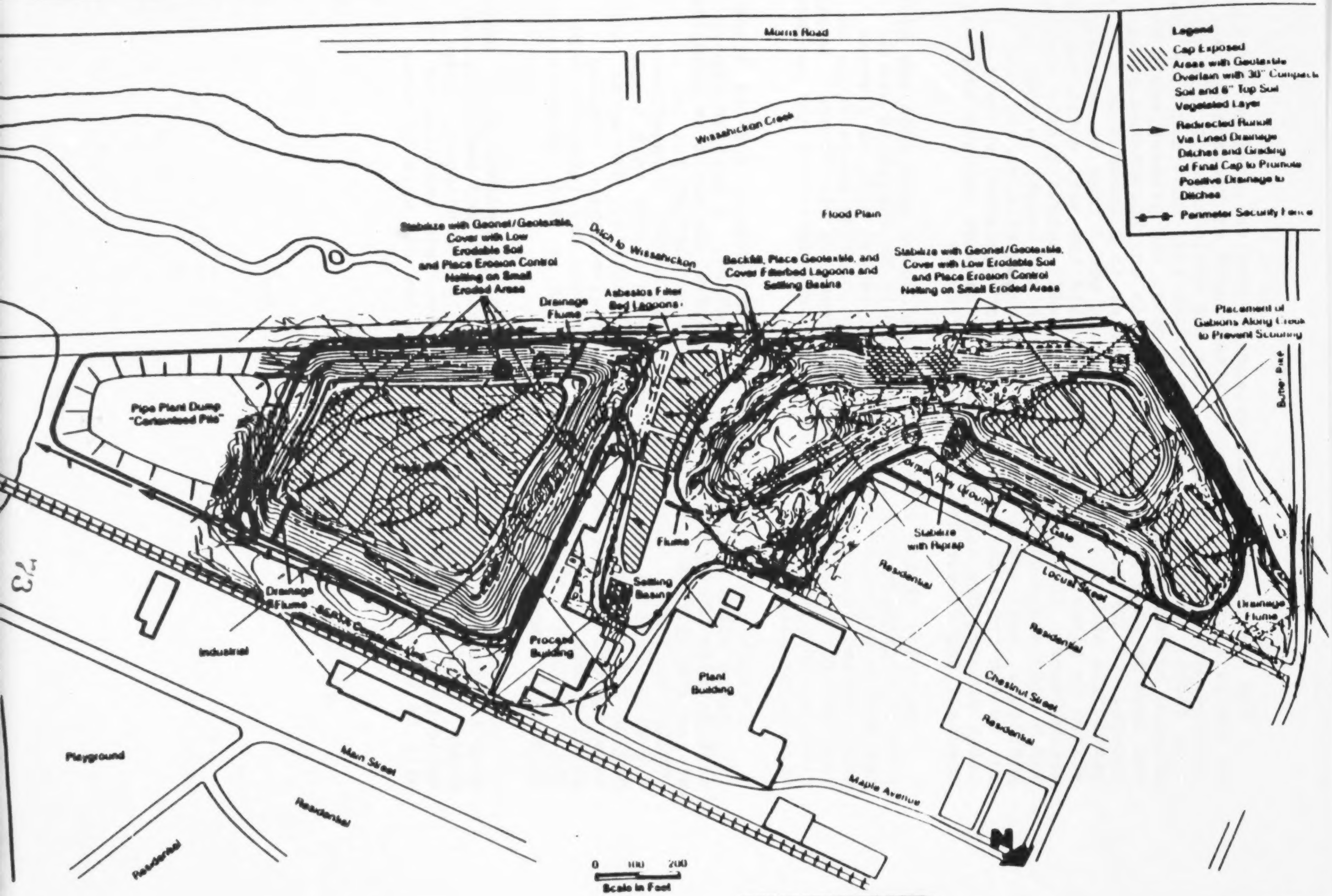
Legend
▨ Cap Exposed
Areas with Geotextile
Overlain with 30" Compact
Soil and 6" Top Soil
Vegetated Layer
→ Redirected Runoff
Via Lined Drainage
Ditches and Grading
of Final Cap to Promote
Positive Drainage to
Ditches
Perimeter Security Fence
Morris Road
Wissahickon Creek
Flood Plain
Ditch to Wissahickon
Stabilize with Geonet/Geotextile,
Cover with Low
Erodable Soil
and Place Erosion Control
Netting on Small
Eroded Areas
Drainage
Flume
Asbestos Filter
Bed Lagoons
Backfill, Place Geotextile, and
Cover Filterbed Lagoons and
Settling Basins
Stabilize with Geonet/Geotextile,
Cover with Low Erodable Soil
and Place Erosion Control
Netting on Small Eroded Areas
Placement of
Gabions Along Creek
to Prevent Scouring
Butler Pike
Pipe Plant Dump
"Contaminated Pile"
Flume
Settling
Basins
Process
Building
Plant
Building
Former Play Ground
Stabilize
with Riprap
Gate
Drainage
Flume
Residential
Locust Street
Residential
Chestnut Street
Residential
Maple Avenue
Industrial
Drainage
Flume
Main Street
Playground
Residential
Residential
N
0 100 200
Scale in Feet

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FIGURE 1 3 ALTERNATIVE 4 · ON SITE CLO.

Cap construction would primarily involve covering the tops of the piles with a to be determined depth of recompacted soil (graded promote to drainage). The cap would consist of a geotextile fabric above which would be placed soil that exhibits low erosion characteristics. Trees, shrubs, and grasses would be cut down to pile level and covered with an impregnated geotextile material to inhibit future growth prior to placement of the geotextile and soil cap. Jute-netting would then be securely staked in place, where required, to hold the soil until vegetation establishes. The side slopes are already substantially covered, and a good stand of crown vetch vegetation exists in most locations. Additional soil would be placed over geotextile fabric that was cut to fit and anchored in place, then vegetated; where significant erosion has occurred to date. Drainage improvements via channels and flumes would also be performed.

Security at the site would be increased such that new eight-foot tall fencing with barbed-wire would be installed around the entire perimeter of the piles and lagoon area to prevent unauthorized access to on-site areas. Locking gates would be provided for access to authorized persons in the future. Warning signs would also be posted on the fences, detailing the asbestos hazards on-site.

Inspections of the site would be biannually for the first five years after initiation of remediation. A written report that details the effectiveness of remediation would be submitted at the end of five years (as required by Section 121 (c) of CERCLA, 42 U.S.C. Section 9621(c)). An annual inspection of the site would be required thereafter to ensure that human health and the environment are being adequately protected. Long term cap maintenance such as local erosion repair, grading, seeding, etc., will be required to promote cap integrity over the long term. However, based on action in 1984, future maintenance is expected to be low.

During on-site activities, erosion and sedimentation controls such as channels, silt fences, jute-netting, and sedimentation ponds would be used, as needed. Finally a contingency plan would be developed to ensure that appropriate remedial action will be taken if local failure of the new cap were to occur.

B. NON-COST ANALYSIS

1. Technical Considerations

The primary function of a cap that covers asbestos material is to provide a barrier between the asbestos and the atmosphere, thereby preventing releases of fibers into the ambient air. The cap must be structurally sound to prevent re-exposure of the asbestos fibers and provide the integrity necessary to ensure public health and safety at the site under existing and potential future uses. Cap design must include considerations for potential frost heave and/or settlement damage, as well as erosion control so that risks of exposure to asbestos fibers is minimized. The cap for the Ambler Asbestos Piles site should provide protection for the cap materials and underlying wastes against freeze/thaw effects and should provide increased stability to the surface of the piles.

Installation of a cap on the Locust Street Pile is complicated by the fact that a large number of mature trees and shrubs have grown in certain areas. Over a long period of time which could cause them to break off or fall over and uproot; with subsequent potential release of asbestos fibers. Also, in the summer, leaf coverage can prevent adequate growth of vegetation under trees. This increases the effects of erosion. These trees, shrubs, and grasses would need to be cut down to pile level and the trunks/roots left in place so that the asbestos would remain undisturbed. In this way, the potential for future release by uprooting is addressed. Also, vegetation would be able to grow around the trunks and serve to minimize erosion effects. A geotextile cover impregnated, rootgrowth discouraging geotextile would be placed over these locations to prevent resurfacing of major deep-rooted vegetation. These products are now commercially available for cap applications.

The useful life and reliability of a cap is significantly affected by the degree of maintenance it receives. Therefore, to maximize its efficiency and the length of time the cap maintains its integrity, maintenance would be required (particularly for the next 5 to 10 years after completion of remedial on-site closure).

Installation of a cap on each of the identified waste piles involves common construction practices and materials. However, at the Ambler Asbestos Piles site, the use of lightweight equipment is required because the piles may not be able to support heavy duty machinery in certain locations. The geotechnical analysis performed as part of the RI/FS has indicated a low factor of safety for most existing external side slopes on both piles (0.96 to 1.15 in general for critical locations). Additional detailed geotechnical analysis is recommended for the remedial design stage of the remedial action program for this site to investigate in greater detail how the additional surcharge weight of the three-foot soil cap proposed herein along with the weight of construction equipment during remediation may affect factors of safety for slope stability during and after remediation at specific locations around the piles. Substantial geotechnical effort has been expended during the RI/FS project in order to provide profiles of the piles, soil/waste strength data, existing condition slope stability analysis, etc. From a qualitative point of view it is not currently believed that the additional soil loading which would result from cap installation or surcharges from small, light construction equipment would realistically change the equilibrium of total driving to resisting forces which has apparently established itself in the many years that the main structure of the piles has existed and not failed (based on the proportion of the pile sizes to future additional soil loadings, and the decades over which the pile slopes have maintained themselves without apparent slope instability and no reported slope instability problems encountered during the 1984 emergency action); however, this needs to be confirmed by a more detailed and specific geotechnical analysis during remediation. The final determination in this regard is beyond the scope of this investigation.

For purposes of this ROD it is assumed that cap placement is feasible, with proper future analysis, safeguards, and controls in place.

Caps similar to that discussed in the description of this alternative have been proposed at other sites for asbestos remediation. In June 1987, the EPA issued a Record of Decision (ROD) for the Johns-Manville Superfund site in Illinois. Waste materials primarily containing asbestos fibers had been deposited in a variety of pits. According to the ROD, these pits were to be closed with a soil cap consisting of 6 inches sand, 18 inches clay, and 6 inches topsoil to be graded and vegetated.

The EPA has also taken a similar approach at a number of Superfund sites in Nashua, New Hampshire, and surrounding vicinity. Thirty-inch covers were installed at the Shady Lane, Pointer, Bursey, Matarazzo, Ridge Avenue, Lowell Road, Niquette Drive, Russell Avenue, and South Bank asbestos sites. The covers were applied in accordance with the U. S. Army Corps of Engineers specifications which include an application of geotextile fabric if slopes were encountered, then bank-run gravel, then pea gravel (if the bank-run gravel was too coarse), then topsoil. Erosion control devices such as concrete runoff pans, drainage ditches lined with bank-run or larger stone and vegetation acclimated to the area also were installed. If slopes were steep, gabion walls were erected to prevent sloughing of cover materials applied. The state of New Hampshire cover specifications differed in the depth of the cover; a 24-inch cover was deemed acceptable to the State. The 30-inch cover applied by the Corps of Engineers on the past actions might be increased to a 36-inch cover, so it is evident that there is some difference of opinion regarding the proper depth of the cover. As a point of reference, the Corps of Engineers unofficially designated a 50-year life expectancy on the 30-inch cover when the cover is applied over surface-exposed asbestos. The National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements include a six-inch cover with vegetation as provision of adequate protection to public health and the environment.

This thickness will be designed to ensure that the frost layer does not enter the waste materials more than 10 times per century.

By providing soil for this site, the amount of times that the frost layer reaches the waste materials is minimized. Therefore, the effects of freeze/thaw weathering are addressed. The geotextile fabric also serves to reduce freeze/thaw weathering effects by adding to the stability of the piles and cap system.

The sides of the Locust St. Piles has a soil cover that averages 12 to 18 inches thick. This material was placed as part of the 1984 Emergency Action at this site. This cover thickness meets NESHAP requirements; however, it is not as thick as the cap proposed for the top of the piles. This is because it is anticipated that the flatter top of the piles would be more susceptible to moisture and frost penetration. Additional soil is not proposed to be placed on the side slopes to attain a desired thickness as part of the alternative because a wellestablished vegetative cover already has been noted to exist on the great majority of the slopes on both piles currently, and no adverse affects from freeze-thaw effects have been apparent in the nearly four years since these soils have been in place.

Remedial action repair of the exposed side slope areas under this alternative would include placement of cut-to-fit and staked-in-place sections of geotextile fabric soil fill of comparable thickness to the existing cover on the side slopes (crown-vetch, since it has already proved successful to date at this site).

In general, the crests would be graded with fill prior to cap placement as to achieve a center-line crown and drain to the edges of the tops of slopes where drainage channels and corrugated metal flumes, combined with rip-rap would carry flows of the toes of the slopes and offsite through/or adjacent to the existing lagoon area. In this way, concentrated flows would be managed more effectively than by allowing the runoff to flow over the side slopes in a random manner (which would increase long-term erosion potential). A result of this action would be that the center of the pile tops would actually have more the depth of the soil cap. For the lagoon and settling basin remediation, sediments would have to be scraped or excavated from the sidewalls and deposited toward the center of the depression. This action is performed so that asbestos-containing materials do not remain near ground surface. The geotextile fabric placed over the sediments would prohibit upwar migration of asbestos fibers and dispersion into the air before backfilling. The additional clean compacted soil backfill would also prohibit migration. This soil may be as thick as 10 to 15 feet in order to bring the lagoon area back up to original grade as to promote positive drainage.

As previously noted, the water from the lagoon and settling basins must be treated prior to discharge on-site. This treatment would consist of flocculation with the addition of lime, sedimentation, and passage through a sand filter. If needed, the water could also be sent through a microfilter.

Dust control and worker occupational safety measures (against potential asbestos and physical hazards) are required during remedial activities as part of this alternative, however, to a lesser degree than with alternatives involving substantial intrusion into the piles.

Overall, this alternative appears to be the most technically fea option to prevent future release of asbestos from the site, as well a minimizing potential for direct contact and inhalation exposures to asbestos during remediation.

2. Institutional Considerations

Several institutional considerations are associated with the onsite closure alternative. In some cases, permits may not be required for on-site remedial technologies (Section 121(e) of CERCLA, 42 U.S.C. Section 9621(e) and 40 C.F.R. Section 300.68(a)(3)). However, all of the processes associated with cap installation and water treatment must comply with the following action-specific ARARs and consider guidelines, as detailed below:

ARAR - An erosion and Sedimentation Control Permit from the PADER Bureau of Water Quality Management and/or the USDA Soil Conservation Service is not required for sites under 25 acres in size. However, the Montgomery County Conservation District requires that a soil erosion control plan be written and implemented for construction activities. This plan must be available for review on-site.

ARAR - A Floodplain/Stream Encroachment Permit is required by the PADER Bureau of Dams and Waterways for construction or alteration of permanent fill/structures along or in the channel or floodway of any stream. This regulation is directly applicable to the installation of gabions or rip-rap along the Locust Street Pile.

ARAR - A Discharge Permit from the PADER Division of Water Quality Management must be applied for and the expected pollutant levels identified if the potential exists for asbestos to be present in any discharge to surface water.

GUIDE-LINE - The OSHA standard of 0.2 fibers/cc for asbestos would be used as a guideline for determining appropriate safety practices. It is anticipated that during intrusive activities into the asbestos-containing material, Level C protection equipment will, as defined by U.S. EPA Interim Standard Operating Safety Guidance (January, 1983), be used.

GUIDE-LINE - Air sampling during construction activities that include disturbance of the fibrous material would be required under OSHA to monitor occupational exposure.

GUIDE-LINE - 40 C.F.R. Section 264, Subpart N - A multi-layered cap generally conforms to the RCRA technology guidelines, which recommend a three-layered system consisting of an upper vegetative layer, underlain by a drainage layer over a low permeability layer. The cap functions by diverting infiltrating liquids from the vegetative layer through the drainage layer and away from the underlying waste materials. The primary function of a RCRA cap is to control infiltration and leachate from the waste material that may contaminate underlying groundwater. A multi-layered cap is typically used for hazardous waste site closures, which this site is not (based on the RI data collected).

Accordingly, the design of the cap, need not be in accordance with RCRA regulations to be protective. The purpose of a multi-layered cap on an asbestos site is to prevent re-emergence of the waste on the surface of the site through the processes of wind and water erosion, freeze/thaw cycles, site use, etc. In addition, it is desirable to maintain some moisture content in the fibrous material to control airborne releases of asbestos in the event of localized re-exposure. Therefore, it is protective to use innovative cap designs at this site consisting of semipermeable materials.

ARAR - Pennsylvania Municipal Waste Regulations state that the final slopes of a landfill cover may not exceed a grade of 33 percent (25 PA 275.234). The side slopes of the Ambler Asbestos Piles exceed this 33 percent grade requirement in most locations. Alternative 4 does not provide for modification of the slopes, therefore, this ARAR will not be attained. Section 121(d)(4) of CERCLA, 42 U.S.C. Section 9621(4)(1), identifies several circumstances under which certain ARARs may be waived. Two of the permissable circumstances are listed below with an explanation of how they may apply to the Ambler Asbestod Piles site and Alternative 4 of this ROD

- Compliance with this ARAR will result in a greater risk to human health and the environment than alternative options (See Section 121(d)(4)(B). In order to achieve a side slope that does not exceed a 33 percent grade for the waste piles, extensive regrading would be required if the toes of the piles were to remain in their present position. This would mean cutting into the asbestos waste and exposing the asbestos calcium/magnesium carbonate contaminants below. Such action would pose a serious risk to human health and the environment because asbestos fibers would likely become airborn from the disruption. The calcium/manganese carbonate compounds would also have to be stabilized so that they could support a cover system.

- Compliance with this ARAR is technically impracticable from an engineering perspective See Section 121(d)(4)(C). Constructability would be a major concern. Some of the side slopes could be flattened to close to 33 percent by holding the top of slope constant and placing soil on all sides of both slopes. This could not be done around the piles' sides, however, without encroaching on existing structures, the Wissahickon Creek, a portion of Locust Street, the Sewer Authority collection system, and potentially, the railway tracks.

3. Public Health and Environmental Issues

It appears that Alternative 4 can address the remedial objectives, site environmental issues, and contaminant migration pathways identified in this ROD. Capping the Piles, backfilling the lagoon, and backfilling the settling basins can minimize, to the greatest the threat to the environment and public health from the contained asbestos fibers as long as the final caps are maintained. The following public health and environmental issues are associated with the On-Site Closure Alternative:

- Under this alternative, the asbestos-contaminated material at the Ambler Asbestos Piles site would be covered with geotextile and soil (waste piles, lagoon, and settling basins). This action can be expected to result in significant long-term reduction of potential public health risks and environmental impacts resulting from direct contact and migration of asbestos fibers via sediment, surface water, and air transport mechanisms, while minimizing major risks to construction workers that are likely with other alternatives.

- Proper grading, installation, and post-closure inspection can allow the cover to remain as an adequate barrier between fibrous material and the ground surface.

- A low possibility exists for short-term public health risks due to the limited disturbance of the asbestos materials that would occur during cap placement or during backfilling the lagoon and settling basins. However, limited airborne release of asbestos fibers to some degree may result from such actions. The risk to public health would be minimized by implementing an air monitoring program during on-site activities and by using erosion and dust control measures.

- Long-term maintenance and periodic inspections of the site to provide cap integrity and effective site security would need be established. A contingency plan would also need to be developed in the event that catastrophic cap failure occurs, thereby posing a threat to public health and the environment (indicated via the geotechnical analysis as an unlikely event as long as no major changes in external loadings are or internal pile conditions occur).

- Future land use in the lagoon and waste pile area must be restricted to surficial activities and then, only by authorized personnel.

C. COST ANALYSIS

The capital cost of Alternative 4 is estimated at $5,135,000, as presented in Appendix A, Table 14. Operating and maintenance costs, including posttreatment monitoring and maintenance, are provided in Appendix A, Table 15. Since the asbestos is left essentially in place in a secure environment, costs have been allocated for air and surface water monitoring activities for a period of five years after initial remedial actions. Long term visual inspections and maintenance would continue for a total period of 30 years. The monitoring would serve to ensure cap integrity and to detect an asbestos migration from the contained areas. Under Section 121 of CERCLA, 42 U.S.C. Section 9621, an evaluation of the remedial action undertaken at each NPL site is required to confirm or disconfirm effectiveness of the actions to that date.

SELECTED ALTERNATIVE

Section 121 of CERCLA establishes cleanup standards for the site remediation and articulates a preference for remedial actions in which treatment permanently and significantly reduces the volume, toxicity, or mobility of site contaminants. The provision notes that off-site transport and disposal of hazardous substances without such treatment is least favored where practicable treatment technologies are available. The statute mandates selection of a remedial action "that is protective of human health and the environment, that is cost effective, and that utilizes permanent solutions and alternative treatment technologies or resource recovery techniques to the maximum extent practicable."

EPA has reviewed and considered these statutory provisions and the regulations contained in the National Contingency Plan, 40 C.F.R. Section 300, in light of the conditions present at the Ambler Asbestos Site and concludes that Alternative 4 is the most consistent with these requirements. This remediation alternative offers the best combination of effectiveness, implementability, and cost efficiency and involves the use of what can be considered the only currently feasible remedy under CERCLA for asbestos. This alternative meets all applicable or relevant and appropriate requirements or a waiver is justified. The Section on "Evaluation of Alternative 4" describes in detail how ARARs are met or how the waiver is justified. That section further details how the requirements of Section 121 of CERCLA, 42 U.S.C. Section 9621, are met. The proposed cover design is consistent with other EPA and state agency designs that have been proposed and/or approved.

Considering cost, the No Action Alternative (Alternative 1) is the least expensive alternative. However, it does not include treatment, removal, or immobilization of contaminated surface water, sediment or materials in the piles. It meets none of the CERCLA Section 121 objectives to reduce volume, mobility, or toxicity of the waste, and does not meet the remedial action objectives.

Alternatives 2 and 3 (Off-Site Disposal and On-Site Vitrification Solidifation/Stabilization) are extremely costly to implement, with Alternative 3 being the most expensive of all four alternatives.

Alternative 4, On-Site Closure, presents a potential solution to future exposures to contaminants at a much lower cost than Alternatives 2 or 3, although as previously mentioned, some longterm ARARs may be completely met.

Because this remedy will result in hazardous substances remaining on-site, five year reviews, as specific by CERCLA Section 121(c), 42 U.S.C. Section 9621(c), would be required for the remedy, despite the full containment of contamination. As discussed earlier, inspections will be conducted bi-annually for the first five years after the initiation of remedial action and yearly thereafter.

A summary of the comparison of remedial action alternatives is presented in Appendix A, Table 16.

STATUTORY DETERMINATIONS

1. Protection of Human Health and the Environment

The selected remedy will contain the asbestos contamination at the site, which will ensure adequate protection of human health and the environment.

2. Attainment of ARARs

The selected remedy will effectively attain the applicable or relevant and appropriate requirements, where practicable, as set forth in the ARARs section of this ROD.

3. Cost-effectiveness

The selected remedy provides overall effectiveness commensurate to its costs such that it represents a reasonable value for the money.

4. Utilization of permanent solutions employing alternative technologies to the maximum extent practicable

The selected alternative is currently the most appropriate solution for this operable unit and represents the maximum extent to which permanent solutions and treatment can be practicably utilized.

5. Preference for treatment as a principal element

The preference is cannot be satisfied since treatment of the principal waste, asbestos, is not practicable. However, the proposed alternative reduces the toxicity, mobility or volume as a principle element (emphasis added) and also utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

Table 8

Estimate of Capital Costs for Alternative 1: No Action

Item	Description	Quantity	Unit Cost ($)	Total Cost ($)
1	Fencing to enclose site, installed	6,000 lin ft	15/ft	90,000
2	Warning signs	60	100 ea	600
3	Fence gates with locks	4	1,000 ea	4,000
4	Subtotal			100,000
5	Mobilization/demobilization, construction management, site services (20%)			20,000
6	Technology implementation: designs, plans, specifications, regulatory approvals, insurance, bonds, and permits (20%)			20,000
7	Overhead and profit (10%)			10,000
8	Contingency (15%)			15,000
9	Total (rounded)			165,000

Table 9

Estimate of Operating and Maintenance Costs for
Alternative 1: No Action

Item	Description	Quantity	Unit Cost ($)	Total Cost/yr ($)
1	Long-term monitoring			
	● Annual analyses for asbestos (including data validation)			
	- Air	8	500/sample	4,000
	- Water	4	500/sample	2,000
	● Labor: sampling	120 hrs	40/hr	4,800
	● Labor: site inspection	20 hrs	40/hr	800
	● Labor: report	60 hrs	50/hr	3,000
	● Expenses		Lump sum	400
2	Fence maintenance		Lump sum	3,000
3	Subtotal			18,000
4	Administrative (15%)			2,700
5	Contingency (15%)			2,700
6	Annual-total (rounded)			23,400

Note: Annual cost/year required for 30-year period after remedial action.

Table 10

Estimate of Capital Costs for Alternative 2: Off-Site Disposal

Item	Description	Quantity	Unit Cost ($)	Total Cost ($)
1.	Site preparation (roads, staging areas, etc.)		Lump sum	100,000
2.	Lagoon water treatment (includes flocculation, sedimentation, filtration units, rental, operation, and labor)	1.9 million gals	Lump sum	240,000
3.	Treatability study for surface water remediation		Lump sum	50,000
4.	Surface water diversion/ interception ditches	5,000 lin ft	10/lin ft	50,000
5.	Erosion/sedimentation control system			
	● Silt fences, etc.		Lump sum	50,000
	● Sedimentation basins (2)		Lump sum	250,000
6.	Health and safety equipment/ air monitoring equipment	2,000 days	250/day	500,000
7.	Subtotal			1,240,000
8.	Mobilization/demobilization, construction management, site services (25%)			310,000
9.	Technology implementation: designs, plans, specifications, regulatory approvals, insurance, bonds, and permits (10%)			124,000
10.	Contingency (30%)			372,000

Table 11

Estimate of Operating and Maintenance Costs for Alternative 2:
Off-Site Disposal

Item	Description	Quantity	Unit Cost ($)	Total Cost/yr ($)*
1.	Field inspections, monitoring, reporting during remedial agencies (agencies and borough)	7 years	40,000/yr	40,000
2.	Excavation			
	● Locust Street pile	615,000 cu yds	20/cu yd	1,757,000
	● Plant pile	640,000 cu yds	20/cu yd	1,828,600
	● Lagoon and settling basins	4,500 cu yds	10/cu yd	6,400
3.	Soil analyses for cleanup verification	1,000 tests	750/test	107,000
4.	Backfill excavated lagoon, settling basins, and piles with clean soils	175,000 cu yds	10.50 cu yd	262,500
5.	Bagging/special loading of asbestos wastes before off-site transport, truck decontamination, etc.	833,500 cu yds	5.00/cu yd	595,400
5.b	Dewatering/stabilization of Ca/Mg carbonate wastes before transport. Stockpile, stabilize with 10% CKD addition, mixing, truck decontamination, etc.	426,000 cu yds	15/cu yd	912,900
6.	Transportation of asbestos-contaminated materials			
	● Locust Street pile	615,000 cu yds	15/cu yd	1,317,900
	● Plant pile	640,000	15/cu yd	1,371,400
	● Lagoon and settling basins (from settling and filtering water only)	4,500 cu yds	15/cu yd	9,600

Table 11
(continued)

Item	Description	Quantity	Unit Cost ($)	Total Cost/yr ($)*
7.	Disposal of asbestos-contaminated materials			
	● Locust Street pile	615,000 cu yds	75/cu yd	6,589,300
	● Plant pile	640,000 cu yds	75/cu yd	6,857,100
	● Lagoon and settling basins	4,500 yds	75/cu yd	48,200
8.	Dust control (wetting)			17,100
9.	Regrade/revegetate (hydroseed)			
	● Locust Street pile area	450,000 sq ft	0.10/sq ft	6,400
	● Plant pile area	400,000 sq ft	0.10/sq ft	5,700
	● Lagoon and settling basin area	85,000 sq ft	0.10/sq ft	1,200
10.	Air and surface water monitoring during on-site activities			
	● Labor, laboratory analyses, and reporting		Lump sum	285,700
11.	Post-remediation action monitoring	5 years	2,000/yr	**
12.	Subtotal			
	Years 1 through 7			22,020,000
	Years 8 through 12			2,000
13.	Administrative (15%)			
	Years 1 through 7			3,303,000
	Years 8 through 12			300
14.	Contingency (25%)			5,505,000
				500
15.	Total (rounded)			
	Years 1 through 7			30,828,000
	Years 8 through 12			2,800

*Based on assumption that remedial activities will take 7 years to complete.
**

Table 12

Estimate of Capital Costs for Alternative 3: On-Site Solidification/Vitrification

Item	Description	Quantity	Unit Cost ($)	Total Cost ($)
1.	Site preparation (roads, staging areas, etc.)		Lump sum	200,000
2.	Construction of electrical substation		Lump sum	250,000
3.	Vitrification furnace and equipment (5 tons/hr)		Lump sum	2,200,000
4.	Installation of vitrification furnace and equipment		Lump sum	5,500,000
5.	Purchase of solidification plant (100 tons/hr)		Lump sum	1,100,000
6.	Installation of solidification plant		Lump sum	2,200,000
7.	Construction of a storage area for untreatable debris		Lump sum	50,000
8.	Water treatment unit (includes flocculation, sedimentation, filtration)	1.9 million gals	Lum sum	240,000
9.	Treatability study for surface water remediation		Lump sum	50,000
10.	Treatability study for solidification of $CaCO_3$ compounds		Lump sum	50,000
11.	Treatability study for vitrification of asbestos materials		Lump sum	50,000

*Costs are gross estimates only; vendor(s) unwilling/unable to supply detailed information at the present time.

Table 12
(continued)

Item	Description	Quantity	Unit Cost ($)	Total Cost ($)
12.	Pilot plant for vitrification process (includes temporary electrical hookup)		Lump sum	1,000,000*
13.	Shredding of oversized materials (assume 1% of pile contents)	126,000 cu yds	50,000	50,000
14.	Setup for solidification/ stabilization operation at on-site location(s)		Lump sum	500,000
15.	Surface water diversion/ interception ditches	5,000 lin ft	10/lin ft	50,000
16.	Erosion/sedimentation control system			
	● Silt fences, etc.		Lump sum	50,000
	● Sedimentation basin(s) (2)		Lump sum	250,000
17.	Gabions for Locust Street pile, installed	500 lin ft	200/lin ft	100,000
18.	Health and safety equipment/ air monitoring equipment	10,000 days	250/day	2,500,000
19.	Fences (installed)	7,500 lin ft	15	113,000
20.	Warning signs	75	100 ea	7,500
21.	Fence gates and locks	6	1,000 ea	6,000
22.	On-site disposal of treated wastes	1,000,000 cu yds	20/cu yd	20,000,000

*Costs are gross estimates only; vendor(s) unwilling/unable to supply detailed information at the present time.

Table 12.
(continued)

Item	Description	Quantity	Unit Cost ($)	Total Cost ($)
23.	Off-site disposal of treated wastes	260,000 cu yds	75/cu yd	19,500,000
24.	Subtotal			55,517,000
25.	Mobilization/demobilization, construction management, site services (22 %)			12,214,000
26.	Technology implementation: designs, plans, specifications, regulatory approvals, insurance, bonds, permits (22%)			12,214,000
27.	Overhead and profit (10%)			5,552,000
28.	Contingency (25%)			13,879,000
29.	Total (rounded)			99,376,000

*Costs are gross estimates only; vendor(s) unwilling/unable to supply detailed information at the present time.

Table 13

Estimate of Operating and Maintenance Costs for Alternative 3: On-Site Solidification/Vitrification

Item	Description	Quantity	Unit Cost ($)	Total Cost/yr[1] ($)
1.	Health and safety equipment (expendables)	10,000 days	750/day	125,000
2.	Shredding of oversized materials (assume 0.5% of pile volumes)	6,300	20/cu yd	6,000
3.	Solidification of $CaCO_3$ compounds (includes labor)	426,00 cu yds	100/cu yd	2,130,000
4.	Vitrification of asbestos materials processing costs (includes labor)[2]	1,042,000 tons	160/ton	8,336,000
5.	Excavation/hauling to on-site vitrification unit	1,260,000 cu yds	20/cu yd	1,260,000
6.	Soil analyses for cleanup verification	1,000 samples	750/sample	38,00
7.	Backfill excavated lagoon and settling basins and piles with clean soil	175,000 cu yds	10.50/cu yd	92,000
8.	Placement of vitrified and solidified product back in pile areas	879,000 cu yds	4.65/cu yd	204,000
9.	Backfill clean soil over the vitrified and solidified product piles	70,000 cu yds	10.50/cu yd	37,000
10.	Off-site disposal of materials that cannot be backfilled on-site[3] (includes transportation)	376,000 cu yds	90/cu yd	1,692,000

[1] Based on assumption that remedial activities will take 20 years to complete.

[2] Includes electrical cost of 1,000 kn-hrs/ton of processed material at $0.07/kw-hr (maintenance costs are not well defined due to lack of vendor information.

[3] Assume 30 percent must be disposed of off-site.

Table 13
(continued)

Item	Description	Quantity	Unit Cost ($)	Total Cost/yr[1] ($)
11.	Regrade/revegetate (hydroseed)			
	● Locust Street pile area	450,000 sq ft	0.10/sq ft	
	● Plant pile area	400,000 sq ft	0.10/sq ft	
	● Lagoon and settling basin area	85,000 sq ft	0.10/sq ft	
	● Total	935,000	0.10/sq ft	5,000
12.	Air and surface water monitoring during activities			
	● Laboratory analyses and reporting		Lump sum	400,000
13.	Subtotal			14,325,000
14.	Administrative (15%)			2,149,000
15.	Contingency (25%)			3,581,000
16.	Total (rounded)			20,055,000

Table 14

Estimate of Capital Costs for Alternative 4:
On-Site Closure

Item	Description	Quantity	Unit Cost ($)	Total Cost ($)
1.	Site preparation (roads, storage areas, etc.)	Lump sum	---	25,000
2.	Water treatment unit (includes 2,000,000 gal flocculation, sedimentation, filtration)	Lump sum	---	240,000
3.	Treatability study for surface water remediation	Lump sum	Lump sum	50,000
4.	Surface water diversion ditches	6,500	10/lin ft	65,000
5.	Erosion/sedimentation control system			
	● Silt fences, rip rap, flumes, etc.	Lump sum	---	100,000
	● Sedimentation basin(s)	2		250,000
6.	Grading of piles to create crown for positive drainage (includes soil purchase)	7,500 cu yds	15/cu yds	112,500
7.	Geotextile (installed)			
	● Locust Street pile	162,000 sq ft	0.18/sq ft	29,160
	● Plant pile	198,000 sq ft	0.18/sq ft	35,640
	● Lagoon and settling basins	40,500 sq ft	0.25/sq ft	10,125
8.	Backfill for lagoon and settling basins (low permeability soils with high compactive effort); grade for positive drainage	17,500 cu yds	15/cu yd	262,500

Table 14
(continued)

Item	Description	Quantity	Unit Cost ($)	Total Cost ($)
9.	Soil cover (installed)			
	● Low-erosion soils (30 in)			
	- Locust Street pile	15,000 cu yds	15.00/cu yds	225,000
	- Plant pile	18,300 cu yds	15.00/cu yds	274,500
	● Topsoil (6 in)			
	- Locust Street pile	3,000 cu yds	17.50/cu yds	52,500
	- Plant pile	3,700 cu yds	17.50/cu yds	64,750
	- Lagoon and settling basins	15.00 cu yds	17.50/cu yds	26,250
	● Hydroseed			
	- Locust Street pile	18,000 sq yd	1.00/sq yd	18,000
	- Plant pile	22,000 sq yd	1.00/sq yd	22,000
	- Lagoon and settling basins	4,500 sq yd	1.00/sq yd	4,500
10.	Repair erosion on pile side slopes			
	● Low-erosion soils	2,750 cu yds	35/cu yds	96,250
	● Topsoil	1,200 cu yds	35/cu yds	42,000
	● Erosion-control netting (including installation)	2,000 sq yd	5.00/sq yd	10,000
11.	Tree/shrub removal (includes impregnated geotextile treatment)	Lump sum	---	180,000

Table 14
(continued)

Item	Description	Quantity	Unit Cost ($)	Total Cost ($)
12.	Gabions for Locust Street pile (installed)		Lump sum	200,000
13.	Side slope Buttresses/ Reinforcement*		Lump sum	250,000
14.	Fences (installed) 8 feet tall with barbed wire	6,000 lin ft	15.00/ft	90,000
15.	Warning signs	60	100 ea	6,000
16.	Gates with locks	4	1,000	4,000
17.	Construct earthen berm 6 in. high) along Locust Street and hydroseed		Lump sum	20,000
18.	Air and surface water monitoring during remedial activities			
	● Labor, laboratory analyses and reporting		Lump sum	200,000
19.	Health and safety equipment/ air monitoring equipment	200 days	150/day	30,000
20.	Subtotal			2,985,675
21.	Mobilization/demobilization, construction management, site services (22%)			656,850

*Assumes remedial design geotechnical analysis work indicates slopes essential stable in the future with new soil cap and construction loads, except local areas.

Table 14
(continued)

Item	Description	Quantity	Unit Cost ($)	Total Cost ($)
22.	Technology implementation: designs, plans, specifications, regulatory approvals, insurance, bonds, permits (25%)			746,620
23.	Contingency (25%)			746,620
24.	Total (rounded)			5,135,000

Table 15

Estimate of Operating and Maintenance Costs for Alternative 4:
On-Site Closure

Item	Description	Quantity	Unit Cost ($)	Total Cost Per Year[1] Remediation ($)						
				1	2	3	4	5	6	7–30
1.	Inspections (biannually first 5 years, annually afterward)		Lump sum		1,000	1,000	1,000	1,000	4,000[2]	800
2	Short-term air and water monitoring	12 samples	500/sample		6,000	6,000	6,000	6,000	6,000	
3.	Maintenance									
	• Mowing									
	– Locust Street pile	18,000 sq yd	0.24/sq yd		4,300	4,300	4,300	4,300	4,300	4,300
	– Plant pile	22,000 sq yd	0.24/sq yd		5,300	5,300	5,300	5,300	5,300	5,300
	• Erosion repair and reseeding				25,000	20,000	15,000	15,000	10,000	10,000
4.	Fence maintenance		Lump sum		3,000	3,000	3,000	3,000	3,000	3,000
5.	Subtotal				44,600	39,600	34,600	34,600	32,600	23,400
6.	Administrative (15%)				6,700	5,900	5,200	5,200	4,900	3,500
7.	Contingency (25%)				11,200	9,900	8,700	8,700	8,200	5,900
8.	Total (rounded)				63,000	55,000	49,000	49,000	46,000	33,000

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[1] Present worth cost for this alternative has been estimated for a length of 30 years where the cost incurred in year 6 is the annual cost from years 7 through 30.
[2] Includes 5-year report.

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Table 16

Summary and Comparison of Remedial Alternatives for the Ambler Asbestos Piles Site

Alternative	Present Worth[1] Cost ($1,000)	Technical Considerations (Performance/ Reliability/Implementability/Safety)	Public Health and Environmental Concerns	Institutional Requirements/ Community Response	Comments
1. No Action Upgrade Site Security Monitoring/ Inspections	386	Perimeter fencing, gates, and signs must be carefully maintained.	Does not address any of the site public health and environmental issues identified in the RI and EA. Restricts access to piles and lagoon and reduces risks due to direct contact with asbestos materials; and drownings associated with lagoon. Potential present and future risks exist for trespassers. Does not address potential future risks to public health and environment from airborne asbestos fibers and migration of asbestos fibers and migration of asbestos from piles/lagoon via erosion of piles and sediment transport.	Does not meet remedial action objectives. Public opposition anticipated for the no action alternative due to potential future risks to on- and off-site receptors. Does not meet NESHAPS or PADER guidelines for cover systems or containment requirements for contaminants. Compliance with other site-specific ARARs is not addressed over the short- or long-term. Requires provisions for periodic site inspections and monitoring are required.	The no action alternative does not attain applicable public health and environmental standards.

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[1] Based on 10 percent interest rate.

Table 16
(continued)

Alternative	Present Worth[1] Cost ($1,000)	Technical Considerations (Performance/ Reliability/Implementability/Safety)	Public Health and Environmental Concerns	Institutional Requirements/ Community Response	Comments
2. Excavation/ Removal - Off-Site Disposal Excavation/ dredging of waste piles and lagoon sediments - Pump-out/ remove lagoon surface water - Excavate - Dewatering of sediments On-site treatment of lagoon surface water and sediment water using precipitation flocculation, sedimentation, and/or filtration processes	109,653	Excavation/dredging for conventional applications is feasible and commonly practiced at site remediations. Implementability may be difficult for this site. Contingency measures are required for removal of large-sized debris from the waste piles. Would require extensive design and preconstruction planning due to the low strength and steep side slopes of the piles (inaccessible to large/heavy equipment) and the consistency of the calcium/magnesium carbonate layer of each pile. Contingency measures are required for site safety due to potential collapse of piles during removal operations. Sediment control and dust control measures are required. Stabilization of some of the materials excavated from the site may be required to allow for bulk transport off-site. Special handling (such as bagging) of asbestos-contaminated materials is required prior to transport.	Addresses all site environmental issues and contaminant pathways identified in the RI; all materials imposing potential risk removed from site. It is expected to significantly reduce or eliminate the potential public health risks and and environmental impacts resulting from direct contact, airborne asbestos, and contaminant migration via sediment transport. Excavation of materials in piles presents potential substantial short-term risks to workers, public health, and environment due to release of asbestos fibers into ambient air and collapse of piles (direct contact with materials in off-site areas adjacent to site). Air monitoring is required.	Construction permits for on-site excavation may be required to comply with local building codes. State erosion, sediment, and dust control ordinances require compliance during excavation/removal activities. Permit and/or plan approval may be required for on-site point discharge of treated surface/sediment waters (or discharge to POWT plant). Possibility exists for discharge according to current site NPDES permit. May be opposition from local community due to risks involved with disturbance/removal of the piles. This can result in potential delays.	This alternative expected to exceed applicable public health and environmental standards for the site. The removal/off-site is considered in accordance with SARA guidance and for comparison with the on-site options.

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[1] Based on 10 percent interest rate.

Table 16
(continued)

Alternative	Present Worth[1] Cost ($1,000)	Technical Considerations (Performance/ Reliability/Implementability/Safety)	Public Health and Environmental Concerns	Institutional Requirements/ Community Response	Comments
2. Excavation/ Removal – Off-Site Disposal (continued)		Extensive air monitoring would be required during removal operations to ensure worker safety from potential airborne asbestos fibers.	Potential impacts are associated with the transportation operation.	Compliance with OSHA requirements for ambient air and surface water may be difficult to achieve during removal operations.	
Backfill, regrade, and revegetate where necessary		Extensive implementation time to remove large volumes of material (estimated minimum of 7 years to remove all materials).			
Off-site disposal in secure landfill		On-site treatment of lagoon surface water is required. Concentrated process streams from this treatment process require on- or off-site disposal. Pilot and/or laboratory studies required prior to implementation to determine optimum treatment scheme. Utilizes conventional wastewater treatment techniques.		Availability of off-site landfill space is questionable. Only two landfills in southeastern Pennsylvania are permitted to accept asbestos. Opposition to disposal of large volumes of asbestos waste at off-site facility by public near off-site facility can be expected.	
		Off-site disposal in a secure (or RCRA-approved) municipal landfill is feasible based on well-developed techniques and standard engineering practices. Capacity is limited. Needs to be determined if waste materials can be accepted in municipal landfill as special handling municipal waste.		Large quantity of waste from Ambler Asbestos Piles site must be accepted by the landfill; approval must be acquired to dispose of materials in a municipal landfill as a "special" handling municipal waste.	
				Potential of liability remains for materials disposed of in the municipal landfill in the event of failure.	

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[1] Based on 10 percent interest rate.

Table 16
(continued)

Alternative	Present Worth[1] Cost ($1,000)	Technical Considerations (Performance/ Reliability/Implementability/Safety)	Public Health and Environmental Concerns	Institutional Requirements/ Community Response	Comments
3. On-Site Vitrification/Solidification	270,116	Process has not truly been proven on a full-scale basis. Design requirements, construction technologies, operational problems, and site-specific considerations are undefined. Excavation of piles is a major concern. Problems and potential physical and chemical dangers related to removing asbestos contaminated wastes. Underlying calcium/magnesium carbonate wastes are saturated and exhibit almost negligible shear strength. During remediation it is likely that the technology will not be able to meet ARARs regarding ambient air and/or surface water quality. Solidification techniques for calcium/magnesium carbonate wastes have not yet been tested. Solidification would increase waste volume to the extent that off-site landfill must be considered because there would not be enough room at the site. Vitrified product most likely will have no reuse value.	Short-term risks to public health and the environment are likely to occur as a result of intrusion into the waste piles and release of asbestos fibers. On-site workers will be exposed to physical and and chemical risks due to excavation of the piles, lagoon, and settling basins. The estimated length of remediation is 22–45 years. This time period presents potential risks due to prolonged exposure to site emissions. Decontamination procedures for workers leaving the plant would be extensive. Still, it is expected that a significant amount of asbestos fibers could be carried off-site.	Off-site landfilling may be required. A potential shortage of landfill capacity is currently projected for regions around the site. This situation would not be conducive for the large volumes involved at the Ambler Asbestos Piles site. Operations would require intermediate stockpiles. Public reaction to this situation is anticipated to be unfavorable due to exposure risks to receptors. Transportation safety concerns involved with hauling the vitrified/solidified product off-site may generate unfavorable public reaction. Site-specific ARARs related to air and surface water quality would likely not be met during remedial activities.	This alternative may not attain all applicable ARARs.

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[1] Based on 10 percent interest rate.

Table 16
(continued)

Alternative	Present Worth[1] Cost ($1,000)	Technical Considerations (Performance/ Reliability/Implementability/Safety)	Public Health and Environmental Concerns	Institutional Requirements/ Community Response	Comments
3. On-Site Vitrification/Solidification (continued)			Ambient air, occupational air, and surface water quality ARARs may be exceeded at times during remediation. Implementing this alternative may cause more migration of asbestos fibers to off-site locations than if no remediation beyond the current status was attempted.	(CERCLA) According to SARA guidelines, the use of treatment technologies may not be practicable at some sites with large volumes of potentially low concentrated wastes (e.g., large municipal landfills or mining sites). Remedies involving treatment at such sites may be extremely expensive or difficult to implement.	
4. On-Site Closure	5,144	Geotextile and soil cover for the waste piles, lagoon and settling basin sediments will serve as long-term protection of the surrounding environment from exposure to asbestos fibers. Cover placement will utilize lightweight construction equipment. The stability of the piles may not be sufficient for heavy duty machinery. Three feet of soil above the geotextile will provide sufficient protection of the waste materials from the effects of freeze/thaw weathering.	This alternative can be expected to result in significant long-term reduction of potential public health risks and environmental impacts resulting from direct contact and migrating asbestos fibers via sediment, surface water, and air transport mechanisms. Proper grading, installation, and post-closure inspection will ensure that the cover remains and an adequate barrier exists between the asbestos materials and the ground surface.	Need approval from the Montgomery County Conservation District for land disturbance. Sediment and erosion control plan is required by soil conservation district office. Need approval from PADER for stream encroachment and discharge of treated waters on-site. Must meet OSHA guidelines for asbestos workers. Cap design is consistent with other EPA designs that have been approved for asbestos sites.	Alternative potentially attains all applicable requirements, except PADER 3H:1V Sideslope ARAR

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[1] Based on 10 percent interest rate.

FINAL RESPONSIVENESS SUMMARY

FOR THE

AMBLER ASBESTOS PILES SITE

AMBLER, PENNSYLVANIA

The U.S. Environmental Protection Agency (EPA) established a thirty day public comment period from May 31, 1988 through June 29, 1988 on the Remedial Investigation/Feasibility Study (RI/FS) and the Proposed Plan for the Ambler Asbestos Piles site in Ambler, Pennsylvania. The public comment period was extended an additional thirty days, to July 29, 1988, at the request of the Ambler Borough Council and Nicolet Industries, Inc. A further request from the council to extend the comment period an additional ninety days was denied. The RI/FS and other site related documents utilized by the EPA to select a preferred remedial alternative are included in the site repository and have been available to the public since the beginning of the public comment period. In addition, copies of the Proposed Plan were distributed at the June 16, 1988 public meeting. The purpose of this responsiveness summary is to summarize comments on these documents as expressed by residents, local officials, and other interested parties during the public comment period and to provide EPA's responses to the comments. Public comments have been submitted both verbally and in writing during the public meeting and public comment period. Written comments are included as Appendix A in this responsiveness summary.

SUMMARY OF MAJOR COMMENTS AND EPA RESPONSES

A public meeting was held at the Ambler Borough Hall on June 16, 1988 at 7:00 p.m. on the proposed plan. Those attending the meeting included representatives from EPA, the Pennsylvania Department of Environmental Resources (PADER), and the Ambler Borough Council, as well as area news reporters, and approximately 25 members of the general public. During the meeting, EPA staff presented an overview of the background of the Ambler Asbestos site, the nature and extent of contamination at the site, the alternatives that have been considered for addressing site contamination, and EPA's preferred alternative for remediating the sources of contamination. Following the presentation, EPA answered questions from the citizens about the proposed alternatives and EPA's preferred method of site remediation.

Questions, comments, and concerns received during the meeting and the comment period are summarized below and are categorized into the following topics: 1) Potential Health Hazards; 2) Extent of Contamination; 3) Responsibility for Cleanup and Maintenance of the Site; 4) On-site Closure Alternative; 5) On-site Vitrification Alternative; 6) Other Remedial Alternatives; and 7) Miscellaneous.

Each comment is followed by EPA's response. All significant questions and comments made during the public meeting are included in this responsiveness summary along with written comments received during the comment period. A complete transcript of the meeting is available for public review as part of the Administrative Record established for this site at the Ambler Branch, Wissahickon Valley Public Library, 209 Race Street, Ambler, Pennsylvania.

POTENTIAL HEALTH HAZARDS

Question: A local volunteer fireman asked whether the asbestos piles would create potential health hazards to firemen and local residents if there was a fire on the piles.

Response: The asbestos piles remain covered with two feet of soil that was placed there during the removal action in 1984 and consequently, there is no immediate threat of contact with the asbestos. The asbestos only presents a hazard when it is inhaled and there is little danger of this occurring during a fire as long as intrusive activities are not performed. Also, the wetting action that results from extinguishing would minimize asbestos fibers from becoming airborne.

Question: A local official stated that the Borough of Ambler also acts as a water utility company and asked if EPA's remediation of the site would prevent asbestos fibers from entering the groundwater and migrating into public water supplies.

Response: EPA studies show that, due to the size of the particles, asbestos fibers do not migrate in groundwater. The fibers are too large to move through soil and they actually bond together and create a filter through which groundwater can migrate and asbestos can not migrate.

Question: A resident expressed concern that, even though the asbestos does not currently present a public health threat, it could potentially become a problem in the future if it is left in its present place. The resident mentioned that a natural disaster could conceivably expose the public to the asbestos.

Response: The present situation with the asbestos piles is such that emissions of asbestos was not found to be emitted from the piles that presents a threat to human health and the environment were not found. The remediation proposed by EPA will act to continue to keep potential health threats at a low stage. The remediation also will serve to further stabilize the piles against probable natural disasters.

Question: A resident wanted to know how EPA could insure the long-term safety of residents if the asbestos was not removed from Ambler.

Response: The remediation proposed by EPA can successfully mitigate the pathways through which asbestos could potentially migrate away from the site. The soil and vegetation cap placed on the piles in 1984 provides an effective barrier between the asbestos and the atmosphere. The capping alternative that EPA would like to implement in this remedial action would provide a more permanent means of containing the asbestos. The remediation would also include a long-term maintenance program to provide for the continued integrity of the cap.

EXTENT OF CONTAMINATION

Question: A resident asked what percentage of the piles are composed of asbestos and what other materials are contained in the piles.

Response: Asbestos contaminated material constitutes approximately 15 to 20% of the piles. The piles were originally constructed from slag and cinders, and since that time calcium and magnesium carbonate waste, and the asbestos containing wastes were added to the piles. Some areas of the piles contain as much as 50% asbestos at varying depths throughout the piles. The calcium carbonate is a chalk-like material that is currently about 110 to 120% saturated and is in a wet, plastic-like form.

Question: A local official stated that, in 1971 and 1972, the residents were told that there were no problems associated with having asbestos in Ambler. He further noted that it appeared to him that the same information was stated at the public meeting in 1988. He expressed concern that he would be hearing the same remark in 1990.

Response: EPA has never stated that there were no problems with the Ambler Asbestos piles. EPA conducted an emergency removal action in 1984 to remove the immediate threat of airborne and waterborne asbestos particles. The RI/FS for the site was initiated following that, and at this time, EPA wants to more fully close (cap) the Ambler Asbestos Piles site.

Question: A citizen asked how long it would take for the calcium carbonate slurry in the piles to dry out and solidify.

Response: The solidification of the calcium carbonate slurry is a naturally occurring process that was discovered during the RI. It was not investigated to the point where any predictions could be made as to whether, or when, the slurry would completely solidify.

Question: Two citizens asked if it would be possible to remove the 15 to 20% of asbestos in the piles without having to remove the piles completely.

Response: Even though the majority of the asbestos is located toward the top of the piles, there are significant amounts of asbestos above the 10% level that go as deep as 35 feet. The asbestos cannot be conveniently removed from the piles because of stability and constructability problems. In addition, it is likely that substantial asbestos would be released to the environment if extensive intrusive activity was attempted.

RESPONSIBILITY FOR CLEANUP AND MAINTENANCE OF THE SITE

Question: A local official wanted to know if remedial actions at the site would result in any financial costs to Ambler Borough either now, or in the future.

Response: EPA is approaching the PRPs through legal channels to seek funds expended for remedial activities at the site. If negotiations with the PRPs fail, Superfund monies will then be used for site clean-up. Ambler Borough will not have to assume any financial responsibility for the remediation of the site.

Question: A local official asked if Superfund money would be available only as long as the Superfund Bill existed.

Response: The Superfund Bill was initially passed in 1980 with a fund of $1.6 billion. The bill was reauthorized in 1986 and the fund was raised to $8.5 billion. A future reauthorization could increase that to a higher amount, therefore, there should not be a problem with availability of funds.

Question: A resident asked whether a new buyer of the Ambler Asbestos Piles site would be financially liable for the remediation and maintenance of the site.

Response: EPA considers any past or present owner of a Superfund site a PRP. Therefore, even if a site is in the midst of a sale, the potential owners would have to negotiate with EPA regarding the potential financial and remedial responsibilities associated with the site.

Question: A resident wanted to know who was responsible for cutting the gras on the site. The resident said that the grass was not being cut often enough, and the long grass was causing insect problems in the local neighborhood.

Response: At the present time, maintenance of the site is EPA's responsibility. However, EPA will probably be negotiating a maintenance agreement with either the PRPs, or with PADER, for long-term maintenance of the site.

Question: A resident asked if anything could be done to prevent site access by children who play on the property. The resident mentioned that children can get through the fence that surrounds the site property.

Response: It is difficult to prevent children from climbing over the fence, but part of EPA's proposed remedy for the site includes a higher fence around the site, which should discourage children from entering the site property.

ON-SITE CLOSURE ALTERNATIVE

Question: A resident suggested that leveling out the asbestos piles before covering them with soil would be a viable alternative, and would diminish the visual impact of the piles in the neighborhood.

Response: Leveling the piles would require moving around large amounts of the asbestos, which could potentially create a threat to public health through the release of asbestos fibers into the atmosphere. Also, stability and constructability dangers would be substantial with this type of action.

Question: A resident questioned why it was necessary to cover the asbestos with soil, since that type of action had already been conducted at the site.

Response: The soil covering placed on the piles in 1984 was done as part of an immediate removal action to mitigate imminent public health risks caused by the asbestos. That action was not designed to permanently address the asbestos problem at the site. The on-site closure alternative would entail more than placing additional soil on the piles. It would also include: capping the piles with geotextile material; regrading portions of the piles; constructing a drainage system; and building retaining walls.

Question: Two residents questioned EPA about the security fence that is proposed as part of the on-site closure alternative. They asked if it would be possible to install the fence further inside the site boundaries, and whether it would be necessary to have warning signs on the fence. The residents expressed concern about the visual impact the fence would have on the neighborhood.

Response: EPA will investigate the possibility of placing the fence as unobtrusively as possible. EPA will also work with the community on the wording of the warning signs. The signs do not necessarily have to be alarming, but EPA's main concern is to protect public health.

ON-SITE VITRIFICATION ALTERNATIVE

Question: A resident asked how long the vitrification process would take to complete, and how much it would cost if selected as the remedial alternative for the site.

Response: The vitrification alternative would require several years of pre-implementation testing to determine the time frame necessary for site remediation, but EPA estimates the entire process to take approximately ten years. The estimated cost of the vitrification alternative is $270 million.

Question: A resident asked why EPA considered the vitrification alternative as not being feasible for implementation at the Ambler Asbestos Piles site.

Response: The sheer volume of the material that would have to be handled at the site during a vitrification process makes the alternative difficult to implement. Excavation during the process would also uncover the asbestos, potentially exposing the community to airborne asbestos particles. Other factors that make the vitrification alternative less desirable are: the length of time required to complete the process; the constructability and stability dangers during excavation; the lack of reuse potential for the vitrification product; the extremely high cost of the process, and the likelihood that a new landfill would need to be built either on or off-site to contain the vitrified material.

Question: A citizen asked how EPA had calculated the cost of vitrification alternative.

Response: EPA contacted several firms that handle vitrification and received cost breakdowns from them. Total cost was calculated from the cost per ton and the number of tons per day that the firms could handle, divided into the total tonnage that would require treatment at the site.

Question: A resident asked if EPA had considered the feasibility of prorating the cost of a vitrification facility across several Superfund sites, if the facility could be designed to be portable.

Response: There are a number of different vitrification process technologies and facilities. Some of these technologies may not have the ability to be mobile, consequently, EPA did not factor that variable into the cost.

Question: A local official asked if EPA had considered a method such as "tunnel and slurry" to transport material from the piles to a vitrification facility. This method would replace excavation and prevent exposing the asbestos to the atmosphere.

Response: This methodology would be feasible for some of the internal wet, plastic-like materials; however, it would ultimately produce an uncontrollable pile collapse situation.

Question: A resident asked if EPA would be willing to further investigate the vitrification alternative and meet with a representative of Vitrifix, a vitrification firm that has studied the asbestos piles in Ambler.

Response: EPA is willing to consider any feasible alternative for remediation of the site. If Vitrifix has a feasible plan for vitrifying the asbestos in a manner that is as protective of public health as the on-site closure alternative, and is also cost-effective, EPA will consider the plan. However, Vitrifix is not the only vitrification firm that has shown an interest in the site and EPA will also evaluate any proposals put forward by the other firms.

OTHER REMEDIAL ALTERNATIVES

Question: Two residents wanted to know if the four alternatives presented by EPA for remediation of the site were the only ones that had been evaluated.

Response: The investigation, and evaluation of alternatives, at the Ambler site has been one of the most extensive studies conducted on an asbestos site. EPA maintains close contact with agencies working on asbestos sites and has frequently exchanged information with those agencies to address every possible remedial alternative for asbestos. The alternatives presented by EPA for the Ambler site are the only technical options that EPA is aware of that are currently available for asbestos remediation.

Question: Several residents asked about the feasibility of the Excavation/ Removal, Off-site Disposal alternative.

Response: EPA would prefer not to excavate the asbestos and expose the public to a potential health risk. There is also a land ban going into effect in November 1988 that will prohibit EPA from disposing of any more hazardous waste in existing landfills.

Question: A resident asked if EPA could remove the asbestos and dispose of it in an underground location such as the Centralia, Pennsylvania mines.

Response: The land ban also includes underground locations. It is EPA's policy not to move hazardous materials from one place to another and create further contamination problems. EPA can only dispose of asbestos in landfills that are licensed to accept hazardous waste. Centralia is a town where there is an underground mine fire, and would not appear to be the most suitable as a hazardous waste disposal site. Transportation costs also would be extremely high.

Question: A resident inquired whether it would be feasible to level out the asbestos piles, cover them with soil, and use the area as a potential location for a public housing development.

Response: Since the calcium carbonate is in an unstable wet, plastic-like state, it could not support any construction on top of the piles in its present form.

MISCELLANEOUS

Question: A citizen requested information on whether the Hazard Ranking System (a means of measuring hazardous substances and their potential impacts for placing a site on the National Priorities List) had been used to assess only the asbestos piles at the Ambler Asbestos Piles site, or if other asbestos piles located in the Borough of Ambler had been included.

Response: The test data results which were used by EPA to rank this site were collected from the two on-site piles and the lagoon area.

Question: A resident expressed concern that EPA may have already decided on the remedial alternative that would be implemented at the site.

Response: The purpose of the public comment period and the public meeting is to give the public an opportunity to make any suggestions or comments on site remediation. EPA will carefully consider any feasible alternatives suggested by the public.

Question: A resident asked if EPA would extend the public comment period past the required 21 days in order to give people more opportunity to comment on the proposed alternatives for site remediation.

Response: EPA will extend a public comment period if a reasonable request is made in writing to EPA prior to the end of the current public comment period.

Written comments are attached to this responsiveness summary as Appendix A. Written comments were received from the following:

1. Borough of Ambler
    a. June 17, 1988
    b. July 5, 1988
    c. July 21, 1988
2. Montgomery County Planning Commission
3. Upper Dublin Township
4. Whitemarsh Township
5. Frederick Griffith
6. T & N
7. Nicolet Industries
8. Vitrifix, Inc.
9. Peter Peschke
10. Michael Rittenhouse
11. GeoTech Development Corporation
12. Jean Thompson
13. Frank Romano

Many of the written comments have been responded to throughout the text of th responsiveness summary. EPA received written proposals and comments from several individuals/companies which expressed interest in remedial activities at the site. Every letter/proposal received was responded to by EPA in letter form. The letters and EPA's responses are attached to this Responsiveness Summary as Appendix A. EPA met with the companies that submitted proposals and discussed several innovative technologies which will be further examined during the preliminary design stage.

APPENDIX A

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31 E Butler Ave • Ambler Pa 19002 • 215-646-1000

June 17, 1988

Mr. James M. Seif, Regional Administrator
Environmental Protection Agency
841 Chestnut Street
Philadelphia, PA 19107

Re: Ambler Asbestos Site
Remedial Investigation/Feasibility Study

Dear Mr. Seif:

On Thursday, June 16, 1988 at 7:00 P.M., the EPA held a public meeting to consider written and oral comments regarding remedial alternatives to the asbestos piles in Ambler, Pennsylvania.

EPA representatives conducting the meeting were Nanci Sinclair (3PA00), Hector Abreu - Cintron (3HW17), and Dr. Bruce Mulholtz. They advised the Borough officials of the formal extension procedure to allow additional viable alternatives for the treatment and/or removal of the asbestos piles to be presented to EPA officials beyond the June 29, 1988 deadline.

At this juncture, the Borough of Ambler, Montgomery County, Pennsylvania, hereby makes formal request to the EPA to extend the June 29, 1988 deadline one (1) month so the several technical options, alternatives, and possible solutions, entered into the record of the public meeting, be developed more formally and submitted to the Environmental Protection Agency for consideration.

The major concern the residents of Ambler have at this point is that the EPA had settled on alternative number 4, on-site closure, the preferred alternative of EPA, and held the public meeting merely as a formality.

Ambler Borough is asking the EPA to grant this extension so the alternatives suggested can be given fair and objective consideration.

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I want to take this opportunity to thank you in advance for your consideration in this sensitive and critical issue to Ambler, Pennsylvania.

Sincerely,

Anthony J. Decembrino

Anthony J. Decembrino
Council President

AJD:jh

c/c - Michael Heayn, Mayor
    - Borough Council
    - Representative Saurman
    - Congressman Coughlin

Certif. Mail #P 707 497 143

BOROUGH OF AMBLER

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July 5, 1988

Mr. Hector Abreu-Cintron (3HW17)
Regional Project Manager
U.S. EPA - Region III
841 Chestnut Street
Philadelphia, PA 19107

RE: AMBLER ASBESTOS SITE
REMEDIAL INVESTIGATION FEASIBILITY
STUDY THEREON AND SELECTED PREFERRED
ALTERNATIVE

Dear Mr. Abreu-Cintron:

The Borough of Ambler by expressing herein the consensus of the members of Ambler Borough Council, which it clearly believes to be the unanimous opinion of the Borough's citizens, hereby comments on the captioned report and recommendation pursuant to your invitation to do so.

Initially, we would point out that the Borough made a request for a further time period of thirty (30) days (copy enclosed) during which anyone could comment essentially because of the apparently distorted costs of the vitrification alternative. While advised that such an extension was impossible to grant, the Borough has been informally advised that the period for comment has been extended to July 13, 1988. The Borough is without sufficient knowledge as to whether this extension is applicable to anyone other than the Borough proper, or whether this extension has been communicated to its citizens and other interested parties. When, in this matter (after seventeen (17) years) did sixteen days become of such essence!

We are not aware of your "track record" as to how many times your "selected preferred alternative" has not become the final decision. We do advise that we are dedicated to dissuading you from adopting as final your preferred alternative to leave the Borough of Ambler in essentially the condition in which you found it - encumbered by some 25 acres of asbestos waste. Children cannot

BOROUGH OF AMBLER

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[illegible] E Butler Ave • Ambler Pa 19002 • 215-646-1000

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July 5, 1988

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Regional Project Manager
U.S. EPA - Region III
841 Chestnut Street
Philadelphia, PA 19107

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We are not aware of your "track record" as to how many times your "selected preferred alternative" has not become the final decision. We do advise that we are dedicated to dissuading you from adopting as final your preferred alternative to leave the Borough of Ambler in essentially the condition in which you found it — encumbered by some 25 acres of asbestos waste. Children cannot remain in our school buildings for periods of barely a month after asbestos fibres are located in said buildings; and yet they can be sent home to play and sleep within two hundred (200') feet of the asbestos piles. It just does not make any sense.

The members of Borough Council do not pretend to be experts in any of the alternatives reviewed. They do, however, have the use of their senses, and they have read and viewed on television some of the in-fact removals ordered by EPA or contracted by them or their various State counterparts.

They are not expert on the vitrification process, but they do know that Dr. Roberts said that your report on that alternative was to the extent of a half-hour telephone conversation, and even at that you distorted the effectiveness and cost of that alternative.

As to the fact that in pursuing this alternative or the alternative of the removal to a less densely populated site, workers involved in the process would of necessity have to wear protective clothing; what is so unusual about that?

As a matter of fact, these are the only two actual alternatives that were reviewed. Despite your statement that doing nothing is a mandatory alternative for you to review, this is hardly a viable remedy for a site that was placed on EPA's Superfund National Priorities List in October, 1985.

Second to do nothing is your recommended alternative to cover and vetch the mountains. Now really! This is what you do to plain old garbage and trash in enclosing a solid waste landfill, wherein the contents will naturally decompose - certainly the asbestos will not! How many other situations on the EPA's Superfund National Priorities List have been resolved in this way?

In an AP article, by-lined by Guy Darst appearing in the Philadelphia Inquirer of June 18, 1988 (copy enclosed) Mr. Darst stated"

> "The Superfund clean-up program for toxic waste dumps is largely ineffective and inefficient and does not make full use of new technologies for permanent solutions, a congressional study said yesterday. By choosing cheaper, impermanent solutions, the agency may find itself having to undertake more costly solutions later, said the report by the Office of Technology Assessments."

After quoting the Office of Technology Assessment report further to the effect:

> "Technical evidence confirms that all too frequently, Superfund is not working environmentally the way the law directs it to...",

Mr. Darst observed that:

> "EPA officials have squandered billions on traditional "containment" clean-up methods that provide little lasting protection, it (sic-Office of Technology Assessments) concluded.

Mr. Darst said that the Report called the decisions on clean-up methods at the ten (10) sites (studied) questionable because:

> . If different and readily available technical information had been used, the decision would have changed significantly.
>
> . The range of clean-up alternatives was too narrow.
>
> . The analysis was not comprehensive and not fair to differenet technologies.
>
> . The study work was not internally consistent.
>
> . Mistakes were made in calculations and estimates.
>
> . Critical assumptions were false.
>
> . Conclusions were stated without analysis and documentation.

In response to the report of the Office of Technology Assessment, Winston Porter, Assistant EPA Administrator in charge of Superfund, according to Mr. Darst, criticized the study for a 'superficial look'.

This is precisely what the Borough of Ambler believes has happened to it.

Why is this? Well, the Borough of Ambler does not believe that all possible technologies were thoroughly reviewed, thinks the range of clean-up alternatives reviewed was too narrow. The analysis was not comprehensive to all technologies, critical assumptions, particularly as to vitrification, were false, and mistakes were made in calculations and estimates.

Just what does the Borough of Ambler seek as a reasonable solution to the problem? In the first instance, it does not want to become another statistic such as those sites that were reviewed by the Office of Technology Assessment. In the second instance, it wants whatever is its due in the EPA's carrying out of its Congressional mandate.

What is the mandate?

We do not feel that this communication need be burdened with a review of the total contents of the Solid Waste Disposal Act, the Resource Conservation and Energy Act of 1976, the Comprehensive Environmental Response, Compensation and Liability Act of 1980, the Superfund Revenue Act of 1986, and the Hazardous Substance Superfund Act along with the legislative history of the individual pieces of legislation.

We also are of the opinion that certain highlights of those Acts should be mentioned. In United States v. Shell Oil Co. 605F. Supp. 1064 (1985) a case involving an issue not germain to this communication even if important to the ultimate recovery herein, the Court reviewed the history of CERCLA and that portion of the opinion is attached hereto as Appendix "A".

We are aware that the legislated clean-up standards of CERCLA contain a directive that the long-term uncertainties associated with land disposal as well as the potential threat to human health and the environment associated with excavation, transportation, and redisposal are to be taken into account.

However, also to be taken into account are:

. the potential threat to human health and the environment associated with containment;

. the goals, objectives, and requirements of the Solid Waste Disposal Act (42U.S.C.A. § 6901 et seq.);

. the persistence, toxicity, mobility, and propensity to biaccumulate of such hazardous substances and their constituents;

. short and long-term potential for adverse health effects from human exposure;

. long-term maintenance costs;

. the potential for future remedial action costs if the alternative remedial action in question were to fail.

We have not heard much emphasis placed by the agency on these six criteria that shall be taken into account at a minimum.

We have been advised of the broad definition of "removed" in CERCLA and have seen it used at its broadest in your report when you refer to the "removal" that has already taken place. When we use that term we mean the physical removal of the material from the Borough.

We passionately implore you not to make final your recommended alternative. The Borough of Ambler cannot handle this problem on its own as it cannot only not fund the removal costs in the first instance, but could not even financially support the litigation that would be involved, even assuming that the area of local nuisance law has not been preempted by the federal and state legislation.

You are our only hope.

Do not stand pat with a recommendation that can be defended legally as being within the minimum dictates of the referenced legislation when a complete solution meeting all the mandated considerations is available. Reconsider the vitrification process with an open mind, and if that is not feasible under the circumstances, then come down in favor of in-fact removal of the "white mountains".

We request that you reconsider the exclusion from your recommendation of what has been referred to as the small pile, as asbestos is asbestos regardless of the size of the pile

We make inquiry as to the details of, and liability for, the maintenance of the area under your recommended alternative and suggest that if covering is what Ambler must accept, then once you complete the work and make the area safe that you remove the signs and fences and return the park portion to the citizens of Ambler for their use.

Lastly, we request that you await Dr. Roberts' formal comments before releasing to the press what you believe he has concluded. It is anticipated that Dr. Roberts' report will be here in the next several days. If it is addressed to the Borough, we will immediately forward to you.

Respectfully submitted,
AMBLER BOROUGH COUNCIL

By: Anthony J. Decembrino
Anthony J. Decembrino, President

c/c - Ms. Nanci Sinclair, EPA
- Senator John Heinz
- Senator Arlen Spector
- Congressman R. Lawrence Coughlin
- Representative George E. Saurman
- Commissioner Paul B. Bartle
- Commissioner Betty B. Linker
- Commissioner Rita C.Banning
- Steven West, County Planning Commission

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The Philadelphia Inqu
Saturday, June 18, 1988
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Vol. 318, No. 170 b

Superfund work called ineffective

By Guy Darst
Associated Press

WASHINGTON — The Superfund cleanup program for toxic waste dumps is largely ineffective and inefficient and does not make full use of new technologies for permanent solutions a congressional study said yesterday.

By choosing cheaper, impermanent solutions, the agency may find itself having to undertake more costly cleanups later, said the report by the Office of Technology Assessment.

"Technical evidence confirms that all too frequently, Superfund is not working environmentally the way the law directs it to," the office contended after a study of cleanups at 10 Superfund sites, two of them in New Jersey.

It said the Environmental Protection Agency was not consistently fulfilling the mandate of 1986 regulations that directed it, whenever possible, to permanently reduce the "toxicity, mobility or volume" of the waste in question, the report said.

OTA investigators examined documents for about 100 sites affected by the 1986 amendments to the Superfund act and selected for detailed study 10 they believed to be representative.

"Too much flexibility and lack of central management control are working against an effective, efficient Superfund program," the report said.

EPA officials have squandered billions on traditional "containment" cleanup methods that provide little lasting protection, it concluded. Too often, workers simply cover up wastes or place them in landfills because that is generally cheaper than incineration, biodegradation or other new "permanent cleanup" technologies.

Winston Porter, assistant EPA administrator in charge of Superfund, criticized the study for "a superficial look."

"They continually pressure us to be consistent but I keep telling them the communities aren't consistent, the states aren't consistent and the problems aren't consistent," Porter said. The law requires EPA to consider preferences of affected communities and the states.

Porter said the report made some valid technical points, "but I dis-

(See SUPERFUND on 4-A)

Superfund work called ineffective

SUPERFUND, from 1-A

agree with the extrapolations they make."

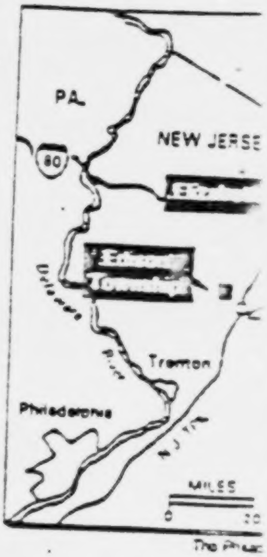
The report noted that many Superfund sites — the nation's worst — presented extremely difficult technical problems and that public expectations for the program were probably too high.

It acknowledged too that "cleanup technology is a new and fast-changing field and the workforce is relatively young and inexperienced. Recent college graduates are often put in charge of multi-million dollar projects. . . . They have almost no one to learn from, as turnover is high. Research papers and technical manuals ... are quickly outdated."

Even so, the authors of the report concluded the EPA had achieved little in spending more than $5 billion since the start of the Superfund program in late 1980.

The report called the decisions on cleanup methods at the 10 sites questionable because:

- If different and readily available technical information had been used, the decision would have changed significantly.
- The range of cleanup alternatives was too narrow.
- The analysis was not comprehensive and not fair to different technologies.
- The study work was not internally consistent.
- Mistakes were made in calculations and estimates.
- Critical assumptions were false.
- Conclusions were stated without



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The report gave these capsule
of the New Jersey sites, the EPA
cleanup costs and the shortc
treatment:

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technology was selected to treat
taminated subsurface soil, which
removal actions had left below the
and covered up with gravel. No
study was used. The cost of incine
overestimated. The cleanup will leav
ed contamination onsite.

In Edison Township, Renora inc
million. The selected remedy mak
offsite landfilling for soils contamin
PCBs. Also, biological treatment wa
for soils contaminated with divers
compounds and toxic metals and fo
nated groundwater, but no treatab
supported its selection.

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gress, faced with sites such as Love Canal, clearly understood that the *mere regulation* of current land disposal would not adequately protect the public health and welfare or the environment.

CERCLA was enacted in 1980 to provide for "the cleanup of inactive hazardous waste disposal sites." (Preamble to CERCLA, Pub.L. No. 96–510, 94 Stat. 2767.) The House Committee on Interstate and Foreign Commerce reported that it was their intent in CERCLA "to initiate and establish a comprehensive response and financing mechanism to abate and control the vast problems associated with abandoned and inactive hazardous waste disposal sites." (H.R.Rep. No. 96–1016, 96th Cong., 2d Sess. 22, *reprinted in* 1980 U.S.Code Cong. & Ad.News 6119, 6125 [to accompany H.R. 7020] (hereafter "House Report").) The background and need for CERCLA are explained in the House Report as follows:

> "Over the past two decades, the Congress has enacted strong environmental legislation in recognition of the danger to human health and the environment posed by a host of environmental pollutants. This field of environmental legislation has expanded to address newly discovered sources of such danger as the frontiers of medical and scientific knowledge have been broadened.
>
> After having previously focused on air and water pollutants, the Congress, in the Resource Conservation and Recovery Act of 1976, provided a *prospective* cradle-to-grave regulatory regime governing the movement of hazardous waste in our society. Since enactment of that law, a major new source of environmental concern has surfaced: the tragic consequences of improperly, negligently, and recklessly [sic] hazardous waste disposal practices known as the '*inactive hazardous waste site problem*.' The unfortunate human health and environmental consequence of these practices has received national attention amidst growing public and Congressional concern over the magnitude of the problem and the appropriate course of response that should be pursued. *Existing law is clearly inadequate to deal with this massive problem*." (Emphasis added.)

House Report at 17–18, 1980 U.S.Code Cong. & Ad.News at 6120.

The Report went on to detail the inadequacies of existing law. Of particular significance to this discussion is the following observation:

> "(c) *Deficiencies in RCRA* have left important regulatory gaps.
>
> (1) The Act is *prospective* and applies to past sites only to the extent that they are posing an imminent hazard. Even there the Act is of no help if a financially responsible owner of the site cannot be located." (Emphasis added.)

House Report at 22, 1980 U.S.Code Cong. & Ad.News at 6125.

The Senate Report from the Committee on Environment and Public Works, accompanying S.1480, also recognizes that RCRA was not the final solution to the hazardous waste problem. (S.Rep. No. 96–848, 96th Cong., 2d Sess. (1980) (hereafter "Senate Report").) After recounting a number of environmental disasters, including Love Canal, the report concluded:

> "There is limited authority to solve these problems. Regulations promulgated in May under subtitle C of the Solid Waste Disposal Act [RCRA], which impose tough new standards for operating toxic waste disposal facilities, are expected to greatly upgrade the Nation's *active toxic waste disposal sites*. But the regulations do not address those situations where an owner is unknown or is unable to pay the cleanup costs, *nor do they address the clean up of* spills, illegal dumping, or *releases generally*." (Emphasis added.)

Senate Report at 10–11.[1]

---

[1] Other courts have recognized that CERCLA was enacted in response to the inadequacies of RCRA. *United States v. Northeastern Pharmaceutical and Chemical Co.*, 579 F.Supp. at 839; *United States v. A & F Materials Company, Inc.*, 578 F.Supp. 1249, 1252 (S.D.Ill.1984); *United States v. Price*, 577 F.Supp. 1103, 1109 (D.N.J. 1983); *United States v. Reilly Tar & Chemical*

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APPENDIX "A"

Thus, while pre-CERCLA law could prevent further pollution from the contemporary generation and disposal of hazardous wastes, it could not effectively abate the ongoing environmental deterioration resulting from wastes which had been dumped in the past. CERCLA was enacted to address these problems. It is by its very nature backward looking. Many of the human acts that have caused the pollution already had taken place before its enactment; physical and chemical processes are at their pernicious work, carrying destructive forces into the future.

The decision was made in CERCLA to clean up these inactive hazardous waste sites. The next question was who should pay for the cleanup. Congress assigned to the categories of persons listed in § 107(a) the liability for all costs incurred in cleaning up hazardous waste sites. This liability scheme was enacted to assure "that those responsible for any damage, environmental harm, or injury from chemical poisons bear the costs of their actions." (Senate Report at 13.)

> "[S]ociety should not bear the costs of protecting the public from hazards produced in the past by a generator, transporter, consumer, or dumpsite owner or operator who has profited or otherwise benefited from commerce involving these substances and now wishes to be insulated from any continuing responsibilities for the present hazards to society that have been created." Senate Report at 98.

See State of Ohio ex rel. Brown v. Georgeoff, 562 F.Supp. 1300, 1312 (N.D.Ohio 1983) (citing additional legislative history and concluding that "there is little doubt that Congress intended for those individuals who were responsible for creating the hazards from these wastes to bear the cost of clean up.")

APPENDIX 'A'

BOROUGH OF AMBLER

31 E Butler Ave. • Ambler Pa. 19002 • 215-646-1000

1888

1988

Mr. Hector Abreu-Cintron (3HW17)
Regional Project Manager
U.S. EPA - Region III
841 Chestnut Street
Philadelphia, PA 19107

July 21, 1988

RE: AMBLER ASBESTOS SITE
REMEDIAL INVESTIGATION
FEASIBILITY STUDY THEREON AND
SELECTED PREFERRED ALTERNATIVE

Dear Mr. Abreu-Cintron,

The Borough of Ambler encloses herewith a copy of the report by the Hazardous Waste Treatment Council et al entitled "Right Train, Wrong Track: Failed Leadership in the Superfund Cleanup Program", dated June 20. 1988, by way of an addendum to its response of July 5, 1988 to your recommended alternative regarding the Ambler Asbestos Site.

Further, the Borough is meeting on July 25, 1988 with Dr. Edgar Berkey of the Center for Hazardous Material Research at the University of Pittsburgh in order to determine whether his services and those of his associates will be retained by the Borough to review your report.

If the outcome of that meeting results in the contracting of Dr. Berkey's services, he will be in contact with your offices directly.

Sincerely,

Anthony J Decembrino

Anthony J. Decembrino
President Ambler Borough Council

Enclosure with ribbon copy only because of bulk.

cc: Ms. Nanci Sinclair, EPA
Senator John Heinz
Senator Arlen Spector
Cong. R. Lawrence Coughlin
Rep. George E. Saurman

Commissioner Paul Bartle
Commissioner Betty Linker
Commissioner Rita Banning
Steven West, County
Planning Commission

Upper Dublin

801 LOCH ALSH AVENUE
FORT WASHINGTON, PA. 19034
Phone: (215) 643-1600

PATRICK J. ZOLLO
President

HARRY E. LENZ
Vice President

NORTON A. FREEDMAN
JUDY HEROLD
RICHARD R. RULON
JAMES B. BOCKIUS
CHARLES M. BOLIG

GREGORY N. KLEMICK
Manager

RAYMOND JENKINS
Solicitor

July 13, 1988

Mr. James M. Seif
Regional Administrator
Environmental Protection Agency
841 Chestnut Street
Philadelphia, PA 19107

re: Borough of Ambler, Montgomery County, Pennsylvania Asbestos Site - Remedial Investigation/Feasibility Study

Dear Mr. Seif:

I reference a letter dated July 5, 1988 from Mr. Anthony J. Decembrino, President of Ambler Borough Council, to Mr. Hector Abreu-Cintron, Regional Project Manager of your agency, pertaining to the Ambler Asbestos Site Remedial Investigation/Feasibility Study. In that letter, Ambler Borough, in detail, documented and explained its strong opposition to your agency's recommendation of "on-site closure" of the asbestos piles in the Borough resulting from the Remedial Investigation/Feasibility Study. Ambler Borough has made a formal request to you to reconsider the selection of that alternative and in turn broaden your consideration to an alternative technology of disposal such as "vitrification" or the removal and disposal of the asbestos at an alternative site.

At the July 12, 1988 monthly meeting of the Upper Dublin Township Board of Commissioners, this matter was publicly discussed, and the Board of Commissioners unanimously voiced their strong support of Ambler Borough's position that you reconsider the alternative of on-site closure of the asbestos.

Upper Dublin Township, in our review of the recent Office of Technology assessment report regarding the Superfund Cleanup Program, finds that their comments are very persuasive with regard to the criticism that the choice of cheaper, less permanent solutions, while in the short run may save money, in the long run may prove more costly. Of more importance, however, Upper Dublin Township shares in the grave concern that the alternative selected may by its nature increase the potential threat to human health and safety as well as endanger the environment.

While Upper Dublin Township stands behind the Borough of Ambler's position because we feel it is a correct and very defensible one, we are expressing our opinion and opposition to your preferred alternative to correct this problem as a municipality directly impacted by the asbestos. We have several acres of the asbestos piles within the borders of our Township immediately adjacent to the Borough of Ambler.

In summary, I wish to state again our unequivocal support of the Borough of Ambler in this matter, and I respectfully request that you reconsider your position and broaden the scope of alternatives that you will consider to eliminate this very serious problem.

We appreciate the opportunity to provide our input and comments on this study and would appreciate a timely response to all the concerns that we identified.

Very truly yours,
Gregory N. Klemick
Gregory N. Klemick
Township Manager

GNK:jjs

cc Board of Commissioners
  Mr. Anthony J. Decembrino, Ambler Borough Council President
  Mr. Donald Colosimo, Ambler Borough Manager
  Mr. Hecter Abreu-Cintron, EPA
  Ms. Nancy Sinclair, EPA
  Senator John Heinz
  Senator Arlen Specter
  Congressman R. Lawrence Coughlin
  Representative George E. Saurman
  Commissioner Paul B. Bartle
  Commissioner Betty B. Linker
  Commissioner Rita C. Banning
  Mr. Stephen West, MCPC

CERTIFIED MAIL

MONTGOMERY COUNTY PLANNING COMMISSION

court house • norristown, pennsylvania 19404 • (215) 278-3722
offices: one montgomery plaza, swede and airy streets, norristown

July 13, 1988

Ms. Nanci Sinclair (3PA 00)
Community Relations Coordinator
U. S. EPA Region III
341 Chestnut Street
Philadelphia, Pennsylvania 19107

Re: Ambler Asbestos Piles
Remedial Investigation
Feasibility Study (RI/FS)

Dear Ms. Sinclair:

We have reviewed the Superfund Program fact sheet for the Ambler Asbestos Piles (May, 1988) and portions of the full Remedial Investigation/Feasibility Study (RI/FS) document on file at the Wissahickon Valley Public Library - Ambler Branch. Please consider the following comments and questions below as the result of our preliminary review of the proposed alternatives for cleaning up the Ambler site.

1. The Ambler asbestos pile area under consideration in the RI/FS involves only a portion of the potential asbestos sources within Ambler. It is noted in the RI/FS that potential sources of asbestos are contained in the two Maple Avenue piles, the berm around the reservoir near Maple Avenue and the Nicolet Facility itself, all of which are not contained in the Superfund remediation area. Due to this fact, any proposed remediation action at the Superfund site will not totally control potential asbestos health hazards within Ambler. Logically, similar remediation actions should occur at all possible asbestos waste areas within the Borough in a coordinated manner to provide uniform health and safety benefits to the residents.

2. Though the proposed alternative, site encapsulation, is supposed to provide a sufficient long term isolation of the asbestos from the community, little detailed information is provided regarding long term maintenance, liability, and enforcement measures. This issue is particularly critical given the fact that the site owner, Nicolet Industries, Inc., has filed bankruptcy under Chapter 11. We feel that a detailed plan for site maintenance, liability, and enforcement should be provided for each remediation alternative before one is chosen.

3. It is understood that as part of the Chapter 11 proceedings for Nicolet Industries, Inc., the subdivision and subsequent sale and re-use of the Superfund site and surrounding properties may take place. Ambler Borough will have to review any proposed subdivision and land development plans in accordance with their existing subdivision and zoning regulations. Critical issues, regarding health and safety pertaining to asbestos waste contamination of the proposed property to be subdivided and structures to be re-used, are not part of the Borough ordinances, nor is the Borough or Montgomery County Planning Staff fully qualified to judge the potential health and safety impact pertaining to various subdivision and land development schemes for the Nicolet property. Due to the lack of performance criteria related to contamination in the existing ordinances and qualified staff, we look toward EPA or their contractors to provide guidance regarding: the feasibility of subdivision; the appropriateness of various adjoining land uses; various design and performance standards such as building set back from waste piles; necessary investigations to certify the reusabilty of portions of the Nicolet plant; various access easement requirements for the Superfund site; and other considerations.

4. The RI/FS does not address whether or not the waste pile site could be re-used if the encapsulation technique is chosen. After remedial actions are completed will the site's use be restricted by EPA or will it be up to Ambler Borough and Upper Dublin Township to provide use restrictions under zoning powers? EPA site use control would appear preferable, since actions taken to fully restrict site usage by a municipality under zoning could be met with a challenge of inverse condemnation.

5. In assessing various remediation alternatives, on-site vitrification and stabilization was examined. The technical review of this alternative provided on pages 9-39 gave only a brief mention of the potential for re-use of the waste piles which are primarily calcium/magnesium wastes that contain asbestos. During November of 1987, Ambler Borough gave zoning approval to the BO-RIT Corporation to construct temporary buildings for three years to manufacture pre-cast concrete products out of the Maple Avenue asbestos waste piles. Though little is known about the feasibility of the BO-RIT process, it should be thoroughly examined along with other possible vitrification/solidification re-use processes. Since the Ambler Superfund site has already undergone temporary stabilization which provides adjoining residents with health and safety protection, the appropriate time should be taken by EPA to thoroughly investigate the feasibility of waste pile material re-use prior to selecting any remediation alternative. Such a feasibility investigation might include actual bench testing of various waste material re-use processes.

Please consider our above comments in finalizing the RI/FS. Overall, we feel that the selected alternative for site remediation should be one which fully addresses health and safety concerns of area residents. We would prefer a remediation alternative that removes some if not all of the waste piles from the site; therefore, we ask that you reexamine various vitrification/solidification processes that could produce usable by-products from the waste materials. We also ask for your help in evaluating critical land use issues at and adjoining the site.

Please keep us informed of any future actions at this site. If you have any questions, please call me at 278-3729.

Sincerely,

Michael Stokes

Michael Stokes
Chief Environmental Planner

MS/jr

cc: Ambler Borough Manager
Ambler Borough Planning Commission
Upper Dublin Manager
Steve West, MCPC

Whitemarsh TOWNSHIP

1704

4021 JOSHUA ROAD
LAFAYETTE HILL, PA.
19444—1498
(825-3535)

July 21, 1988

Mr. Hector Abreu-Cintron
Regional Project Manager
U.S. EPA Region III
841 Chestnut Street
Philadelphia, PA 19107

Regarding: Ambler Asbestos Site Remedial Investigation Feasibility Study/ Selected Preferred Alternative

Dear Mr. Abreu-Cintron:

Whitemarsh Township has reviewed a letter from Anthony J. Decembrino, President of the Ambler Borough Council, with regards to the proposal for handling the final disposition of the Ambler asbestos piles.

Unfortunately, we were not aware of the public hearing that was held in Ambler with regards to the recent meeting held in Ambler on this matter. However, we would like to go on record in support of Ambler Borough's position that further time be given to consider the vitrification alternative. This process appears to hold hope for a final removal of the asbestos material from the area under question, and not just an abatement process such as the proposed alternative of covering and vetching the piles.

We hope that EPA will give Ambler Borough the additional time and consideration that is needed in order to evaluate a process to eliminate the problem from the community once and for all.

Very truly yours,

Lawrence J. Gregan

LAWRENCE J. GREGAN
Township Manager

LJG:ae

cc: Board of Supervisors
Donald A. Colosimo, Borough Manager, Ambler Borough

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SEP 28 1988

Mr. Anthony J. Decembrino, President
Ambler Borough Council
Borough of Ambler
31 E. Butler Avenue
Ambler, PA 19002

Dear Mr. Decembrino:

This letter is in response to your letter dated July 5, 1988 concerning the Ambler Asbestos Site Remedial Investigation and Feasibility Study (RI/FS). We would initially like to thank you for submitting your comments to EPA and for giving us the opportunity to respond to them.

As you are aware on September 22, 1988, Mr. Bruce Smith, Ms. Nanci Sinclair and I met with the Council to discuss the Ambler Asbestos Record of Decision (ROD). Many of the questions posed in your letter were fully addressed at the meeting and during a previous phone conversation, but we will respond to them again here for your records.

Your initial request for an extension to the comment period was formally submitted in a letter sent to the Agency dated June 17, 1988. On June 29, 1988, EPA granted the extension until July 13, 1988. On July 5, 1988 you again requested an extension until July 31, 1988, this request was also granted. While we are required to give as little as 21 days for public comment of a proposed remedial action, we have granted the Borough a total of 60 days. Accordingly, we believe we have been extremely accommodating to your request. Further extensions will only delay the necessary work at the Site and will not benefit any of the Borough residents.

Your suggestion of removing the piles to a less density populated site was considered during the RI/FS and it was determined that the threat of exposure during only removal operation was too great to consider the alternative further. In addition, the off-site disposal of the tremendous volume of material was not feasible as the availability of landfill space is a prohibitive factor. Finally, CERCLA discourages against the off-site transport of hazardous materials as a remedial action and promotes practicable treatment when possible. The practicable treatment for the remediation of the asbestos piles at this time is containment.

Regarding your comment "children (being) sent home to play and sleep within two hundred feet of the asbestos pile" and that it posing a threat to them, you have only to read the RI/FS to see that it has been scientifically proven that the piles are not a source of asbestos emissions. In their current state, there is no evidence of any asbestos being emitted from the site. It is very important that you understand this. If there was any evidence whatsoever of potentially dangerous asbestos emission problems coming from the site, EPA would take immediate action to protect public health and the environment. Based on data collected to date no such threat exist in Ambler.

In response to your recommendation to further consider the Vitrification process, you should be aware that we met with Dr. Roberts on June 23, 1988 and discussed the applicability of Vitrofix at the Ambler site at length. Our analysis of his proposal revealed an inadequacy in the funding and construction that would be necessary for the success of the process. The costs of constructing and operating the plant as well as plans for the disposal of the end product were not included in the proposal and therefore was removed from our further consideration.

Our review of the"No Action" Alternative should not cause you any concern as we are required to consider "No Action" in a comparative analysis with the other alternatives. The "No Action" alternative is rarely selected as it does not alleviate the human health and environmental problems that enabled the site to be classified a National Priority.

Your concern regarding the effectiveness of the preferred alternative is not warranted, as the selected remedy is fully protective of public health and the environment, attains Federal and State requirement that are applicable or relevant and appropriate to this remedial action and is cost-effective as set forth in Section 121 CERCLA, 42 U.S.C. Section 9021(b) and Section 300.68 of the NCP. This remedy satisfies the statutory preference for remedies that employ treatment that reduce toxicity, mobility or volume of hazardous substances, pollutants or contaminants (emphasis added). It should be noted that, since asbestos cannot be combusted and is essentially chemically inert, a permanent remedy, as such, cannot at this time, be effectively implemented at this site.

As we have explained and as will be reflected in the ROD, we will be looking into other alternative technologies that have been presented since the finalization of the RI/FS. These technologies will be analyzed in detail in accordance with the National Contingency Plan and with respect to the studies that have been conducted at the site. Of course we will be in contact with you regarding our findings.

If you have any further questions, please contact me at (215) 597-8751.

Sincerely,

Karen M Wolper

Karen M. Wolper, Chief
SARA Special Sites Section

July 11, 1988

Mr. Hector Abreu-Centron
Regional Project Manager
3HIW7 U.S.E.P.A.
Region # 3
841 Chestnut Street
Philadelphia, Pa. 19107

Sir,

The exposed asbestos waste problem of Ambler, Pa. can be eliminated, permanently, with heavy moleaic compounds. In utilizing my 22 years of experience in structural composites, I have developed a proprietary formulation which locks the asbestos fibers into a non corruptible matrix of thermosetting resins. I have every confidence that, given the success of my process demonstrated to date, the "white mountains" of Ambler can be made safe. This method of encapsulation results in a "perma-cast", non bio-degradable material which may then be used for curbs, highway barriers, drainage systems, railroad ties and a host of other community uses. The process will turn a hazard into an asset.

I propose using catalized resins to turn the asbestos to stone, injecting the compounds with a machine of my own design to saturate the asbestos waste wherever it is located. This special technology allows for a multi-faceted approach to immobilizing the asbestos depending upon the ultimate method of disposition. Molding the resultant asbestos/resins material into useful products is a system which would create jobs in Ambler, though if the intent is to bury the now safe asbestos in blocks, we would employ a much less sophisticated procedure. Either way, the danger has been removed.

It is my understanding that your office is soon to make a decision as to the manner in which the asbestos will be rendered harmless. My idea is an extremely cost effective solution, and one which I would ask that you allow me to prove. The highly stable, extremely predictable use of resins is a socially and economically acceptable method of rendering the asbestos in Ambler, and elsewhere, of no environmental impact. Please give me the chance to prove my claims.

I have retained the firm of O'Halloran and Holt, Attorneys to represent me in establishing a corporate vehicle to market my idea. James F. O'Brien, Esq. is well versed in the asbestos industry, having acted as counsel to a company actively engaged in asbestos removal. Should you find my ideas to be of interest, I would ask that you communicate with Mr. O'Brien at:

O'Halloran and Holt & Associates
Attorneys at Law
310 Broadway
Bayonne, New Jersey 07002.

Sincerely,

Fred Griffith

Frederick L.F. Griffith

cc: Ms. Nancy Sinclair
3H1W7 U.S.E.P.A.
Region #3
841 Chestnut Street
Philadelphia, Pa. 19107

Hon. George Saurman
Pennsylvania State Representative
Mattison Avenue
Ambler, Pa. 19002

Mr. Anthony Decembrino
President
Ambler Borough Council
Ambler Borough Municipal Bldg.
Butler Avenue
Ambler, Pa. 19002

Michael Smith, Esq.
Jenkins, Tarquini and Jenkins
140 E. Butler Avenue
Ambler, Pa. 19002

THE PROBLEM

We have reviewed the exhaustive, highly detailed Remedial Investigation/Feasibility Study Report for the Ambler Asbestos Piles, Volumes 1 through 3, as well as the Appendices and Toxicity Profiles. The comments in the Executive Summary, Section 1.0 clearly establish the carcinogenicity of asbestos in humans, and notes that the most significant route of exposure is via inhalation. Additionally, "ingestion of asbestos can occur either directly (e.g. drinking water) or indirectly following inhalation." These comments, and others throughout the Report, are especially troublesome in light of the E.P.A.'s existing proposal for remedial action, which calls for capping in place. Completely aside from the issues of the volume of wastes to be buried, the effect of wind and water erosion and the degree of future costly maintenance, is the fact that to adequately apply a geotextile and soil cover for the waste piles, lagoons and settling basins will require extraordinary vehicular and human traffic on the piles themselves, churning up asbestos fibers and severely polluting the environment. How is it possible to cover 22.3 acres of waste with a geotextile cover and three feet of soil and not disturb the very problem being addressed?

In Volume 3 of the Report, Section No. 10, Revision No. 1, page 9, it is clearly stated that compliance with applicable or relevant and appropriate requirements (ARAR's) is "technically impracticable from an engineering perspective." The ARAR is a state requirement which calls for side slopes of no greater than 33% grade, a regulation which we believe was written to insure that the primary function of a cap, to provide a barrier between the asbestos and the atmosphere, is not completely negated by normal erosion. Section No. 9, pages 9-54 through 9-59 of Column 3 consistently waivers between extolling the virtues of a cap system, and stating how close to untenable the very idea is.

The point here, of course, is that disturbing the piles by capping them with three feet of soil is almost guaranteed. Lightweight construction equipment would be called for, as the report cites in Subsection 5.3 that a low factor of safety for most existing external side slopes has been indicated. Further, pages 9-58 of Section No. 9, Revision No. 1 states that "additional soil is not proposed to be placed on the side slopes", meaning that the three foot cap is only for the top of the piles, which were not addressed in the 1984 remedial action. In sum, there will be no 33% grading of the side slopes, lightweight construction equipment will be moving incredible amounts of topsoil on the top of the piles, exposing the now uncovered asbestos to the vehicular and human traffic, and additional remedial measures to insure slope stability will not be undertaken, as "final determinations in this regard are beyond the scope of this investigation", (Section 9, Revision No. 1, pages 9-56, Volume 3).

The potential for increased future migration of exposed asbestos during the capping remediation is clear. The "upper bench" of the Locust Street Pile is uncapped, as is the top surface of the Plant Pile. Given the effects of continuing erosion/weathering of all side slopes (which will not be covered in the capping proposal), it would appear that the present E.P.A. plan is not altogether feasible.

Disposal of manufacturing wastes, being pharmaceutical and asbestos wastes, may have begun at the Locust Street Pile as early as the 1890's, and in fact the Locust Street Pile may actually be an elevation above the rim of a quarry. Of particular note to us is the magnesium carbonate, a raw material used in the production of asbestos cement piping and shingles, which was dumped in the quarry at the rate of 30 to 40 tons of carbonate waste a day, (Section 1, Volume 1, pages 1-15). Magnesium and calcium carbonate are considered essential human nutrients, and are not considered to be a toxic threat. However, the carbonate slurry which underpins the piles would appear especially susceptible to degradation after the introduction of the weight of three feet of topsoil. Ironically, these materials are one of the major components in our alternative use of the existing waste materials.

THE SOLUTION

Section 9, Revision No. 1, page 6 of the Remedial Investigation/Feasibility Study Report lists the technical feasibility criteria for a potential remedial action alternative. These objectives include performance, reliability, implementation and safety. Paraphrasing the report's definitions, the technical goals are:

- Performance - judged by the degree of effectiveness and useful life.
- Reliability - proven, demonstrable and dependable record of use.
- Implementation - actual application, ease of application and the time required to achieve a given level of response.
- Safety - to the community, environment and workers of this, and future, generations.

Thermosetting polyesters meet, and exceed, the above cited requirements. These reactive mixtures of complex viscous polymers are the foundation for the fiberglass industry, and have been supplied to the industry by chemical manufacturers for decades.

The basis for our idea is to utilize the reinforcing capacity of asbestos fibers by completely immobilizing them in a thermo-setting matrix of polyester resins. I have spent the last 22 years of my life in the plastics and fiberglass industry, and my knowledge of the chemical makeup of polyester resins has enabled me to identify a complex mixture which, upon saturating the asbestos in situ, will allow us to safely remove sections of treated material from the site, and mold a product of great intrinsic use to the community.

Improved fiber reinforced polymers and similar advanced materials have become the staple of the fiberglass and plastics industry. These high performance, lightweight plastics have found a number of socially acceptable uses, and each one requires structural enhancement. The irony of the Ambler asbestos problem, and by extension every such asbestos contaminated waste site, is that the natural fiber itself is one of the foremost bonding additives ever discovered. The original combination of a magnesia suspension and asbestos is very relevant to our proposed solution, and Dr. Royal Mattison's only mistake would appear to have been that the use of magnesia did not forever lock the dangerous asbestos fibers into a non-corruptible matrix.

Within the engineering industry today, magnesium carbonate is an extremely desirable yet prohibitively expensive additive to plastic materials. It appears very clear that the bulk of the Ambler piles are magnesium carbonate, with asbestos fibers being the majority remaining waste. Imagine the combination of all of the best properties of magnesium, as a plastics filler, and asbestos, as a bonding fiber, in a plastic product of HMC's which would not be subject to deterioration. In addition, the analysis of the site defines a substantial concentration of aluminum, highly desirable as a fire retardant, and barium, which is a smoke suppressant with little modification. The molded products from the Ambler site, after we have treated the hazardous wastes with our resins, would therefore be of great strength (tensile or flexural, depending on the end use of the product), fire retardant and smoke resistant. In addition, the other minerals or heavy metals discovered in the analysis, including calcium, maganese, potassium, copper, iron, and lead are not a liability in achieving full catalization of our resins. In fact, some of them hold chemical properties which would be an enhancement to the product.

To our knowledge, there exist over 2500 polyester formulations, (each performs differently) and reflect the specific goal of the end product, but all formulas have one thing in common. A dramatic change occurs in the physical characteristics of the polyester compound, from an easily handled liquid to a super hardened substance which is not prone to damage by fire, water or wind. The compounds, once having accomplished their "cross-linking" of long chain polyesters by catalization through heat, chemicals or ultrasonic means, and in combination with the reinforcing fibers and fillers, become virtually indestructible. Of particular note is that, once locked in the resins, the asbestos fibers will never again be susceptible to migration, either in the air, through the soil or in the water, because they have become the integral binding fiber in the plastic. Even when cut, the resultant saw dust is a plastic with reinforcement, not an asbestos in plastic. In our concept, the liquid absorbed will be a catalyzed HMC, which will completely capture the fibers.

The reactive polymer mixture is of extreme molecular weight, and it's absorption by the asbestos fibers and other site materials will trigger no evaporation. Thus the dry, or hydroscopic materials are locked into the compound and are completely non-friable, and will remain that way.

These high molecular weight "backbone" polymers are diluted with low viscosity monomers such as styrene to achieve the final formative reaction or "cross-linking" of the long chain polyesters. The specific blend of these primary components, and additives, determines many of the in-process properties of the resins, such as its:

* reactivity
* volatility
* reinforcement wetting characteristics
* compatibility between polyester "backbone" and monomer systems
* cost
* exotherm in reaction
* cure rate
* curing shrinkage
* resistance to surface crazing

The particular catalyst/promoter system will be chosen for the specific nature of the manufactured part (shape, thickness, use and coating, if any) and of the molding method (as required, either fast or slow cure times) with or without the use of external heating.

To negate the impact of styrene, we plan to introduce zeolites or other mole sieves to the compound, which will absorb the styrene during the curing process. Also, the inclusion of aluma trihydrate or site substitutes have a dramatic effect on styrene emissions of all HMC's. All of these components, and the composition of the wastes, will be tailored to produce a product with such properties as:

* high heat resistance
* weathering resistance
* light (UV) stability
* elastic modulus
* flexural strength
* tensile strength
* flame resistance
* smoke suppression
* water insolubility
* chemical resistance
* community and environmental safety

The viscous HMC's that we will introduce into the Ambler asbestos waste piles will harden, or cure, only upon the addition of the catalyst. We do not anticipate introducing the catalyst until the slurry of resins and asbestos is extracted from the site, at which time the catalyst will be added in the mold, or closed system. Once formed, the polymer can no longer be melted, nor the reinforcing fibers separated from the matrix. The HMC system is a chemical product of reactions occurring by design, to fabricate a product of great permanence.

SPECIFIC REMEDIAL ACTION

Section 7, Revision 1, page 8 of the Remedial Investigation Feasibility Report defines the specific remedial action objectives for Ambler as being:

* "Effectively restrict access ... This objective would no longer be relevant however, should a complete removal action be implemented".

* "Effectively remove, stabilize or contain the asbestos contaminated media on site so that potential direct contact/incidental ingestion exposures to on site receptors are minimized, and potential releases of asbestos to ambient air and adjacent surface waters are not prevalent in concentrations which would create unacceptable risks to on and off-site receptors".

We propose to eliminate the potential of exposure to asbestos fibers by:

* Utilizing the top most layers of asbestos on the top and sides to create a crust of sufficient strength to support, without stirring the asbestos waste, vehicular and human traffic. This crust would be impenetrable to the elements, and would allow us to continue work on specific site areas from the top.

* By sealing the pile with a strong, UV stable cap, we will begin to dry out the underlying layers of asbestos. At specific intervals in the surface, filtered relief valves will allow for evaporation of ground water by solar heating.

* In sections, and after analysis of the makeup of each such area, we will introduce the viscous HMC's to thoroughly saturate the asbestos, but will not catalyze in situ unless that option of permanently fossilizing the waste piles is elected.

* After the "wet period" of saturation, the slurry mixture will be extracted from the site and catalyzed in a mold or closed system, creating the product to be utilized or marketed. The longer the transition period from viscous state to solid, the better the saturation of the site materials.

It is anticipated that the existing factory structures could be utilized to recast the asbestos waste, and we would propose a plan to pay to the current owner (which we understand to be Nicolet Inc., in Chapter 11 bankruptcy) a fee based upon sales of the recast product as rental for the buildings and any other of the facilities. Again, this would appear to be a method of assisting the E.P.A. in recovering its costs, as the rental or lease payments to Nicolet would be subject to the control of the Bankruptcy Court. Similarly, the actual ownership of the waste piles themselves could become of economic interest.

THE COST

The costs identified for the HMC solution to the Ambler asbestos waste problem must be viewed within the context of the fabrication of usable products which, when utilized by the community, the State or the Federal government, would have at least an imputed value. For commercial distribution, obviously, the recoupment of monies expended would be a function of marketability.

DESCRIPTION	ESTIMATED COST
Site preparation (roads, removal of trees and shrubbery, identification of specific treatment areas, preparation of surface for HMC cap)	$ 385,000
Site equipment (including cranes for tree and shrub removal, dispensing machines, trucks, air monitor equipment, filter masks and protective clothing)	325,000
Security monitors and fences	200,000
Renovation of existing plant facility	1,400,000
Reclamation of existing rail track	275,000
Surface water conduits, surface water control systems	175,000
Treatment studies (Locust Street pile, plant pile, lagoons, etc.)	185,000
Purchase of pilot plant equipment (including mold equipment)	4,500,000
Purchase of pure polyester resins to treat 1.5 million cubic yards of waste	20,820,000
Distribution requirements for marketing	1,500,000
Subtotal	$ 29,765,000

Administration	(15%)	$6,566,000	
Contingency	(25%)	9,860,000	$16,426,000
		TOTAL	$46,191,000

We have every confidence that these costs can be met through a sales/community usage of the finished product of the combination of HMC's and asbestos. In fact, the calcium/magnesium carbonate wastes found in quantities which surpass the amount of asbestos in the Ambler piles will be an important additive to the final product, and will be available at no cost.

As you may be aware, we met with Mr. Abreu-Cintron on Thursday of last week, and visited the site that afternoon, for the first time. This proposal is our attempt to quantify for the E.P.A. what we feel will be entailed in addressing this hazardous waste program with the resins and dispensing technology which I have developed. This proposal contemplates supplying a solution to the approximate 1.5 million cubic yards of waste as identified in the Remedial Investigation/Feasibility Study, but obviously reflects our best estimations and is not meant to flatly state that the process has a certifiable cost. Further, we would of necessity work closely with the E.P.A. in examining the recast materials for safety, and in exploring through an extensive marketing campaign the potential uses and markets for the HMC materials.

We realize that we have arrived on the scene only of late, and that your investigations and studies have been ongoing for a long period of time. Yet we would ask that you carefully consider our idea before electing to pursue the topsoil capping. It is our belief that the HMC proposal will solve the asbestos risk, and that the products which could be manufactured at the site will not only pay for the cleanup process, but eventually result in the physical removal of the "White Mountains".

Respectfully submitted,

Frederick L. F. Griffith

cc: Ms. Nancy Sinclair
3H1W7 E.P.A.
Region #3
841 Chestnut Street
Philadelphia, Pa. 19107

Hon. George Saurman
Pennsylvania State Representative
Mattison Avenue
Ambler, Pa. 19002

Michael Smith, Esq.
Jenkins, Tarquini and Jenkins
140 E. Butler Avenue
Ambler, Pa. 19002

Mr. Hector Abreu-Cintron
Regional Project Manager
Region #3
841 Chestnut Street
Philadelphia, Pa. 19107

Mr. Anthony Decembrino
President
Ambler Borough Council
Ambler Borough Municipal Building
Butler Avenue
Ambler, Pa. 19002

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SEP 28 1988

Mr. Frederick Griffith
21 East 37th Street
New York, New York 10016

Dear Mr. Griffith:

This letter is in response to your July 27, 1988 letter that followed our July 21, 1988 meeting in reference to the Ambler Asbestos Site.

After our meeting, your proposal for utilizing heavy moleaic compounds was analyzed more thoroughly and we believe that more information is needed before EPA can make a final determination as to the feasibility of process. We recognize your need to study the situation further and have decided to include your remedy as one of the two potential alternatives that needs to be looked into further.

You will be contacted by this office as to how you are proceed. If there are any questions, please call at (215) 597-8751.

Sincerely,

Karen M Wolper

Karen M. Wolper, Chief
SARA Special Sites Section

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DOUGLAS A. SATZGER
THOMAS I. SHERIDAN III
NANCY YOUNG

STEWART W. RICHARDS
(1903-1978)

July 29, 1988

Mr. Hector Abreu-Cintron
Project Manager, Ambler Asbestos Site
U.S. EPA Region III
841 Chestnut Street
Sixth Floor
Philadelphia, PA 19107

Re: Ambler Asbestos ("Nicolet") Site - RI/FS

Dear Mr. Abreu-Cintron:

As you know from your recent deposition in United States v. Nicolet, Inc. v. Turner & Newall PLC, Civil Action No. 85-3060 (E.D. Pa.), this firm and the firm of Dechert Price & Rhoads represent T&N plc in that CERCLA cost-recovery case. In that capacity, we respectfully submit this letter and the enclosed comments on the Remedial Investigation/Feasibility Study Report ("RI/FS") issued by the Government for the Nicolet site.

In submitting comments on the RI/FS, we are not admitting any liability for any costs already incurred or to be incurred by the Government relating to the Nicolet site, nor are we waiving any defenses to the claims being made by the Government against T&N.

Furthermore, we are not conceding the accuracy of the factual information contained in the RI/FS. For example, the RI/FS, already revised because of my comments at the June 16, 1988 so-called public hearing, still mischaracterizes the relationship of T&N to the Keasbey & Mattison Company and the Nicolet site. T&N did not purchase Keasbey or the Nicolet site. Instead, T&N merely acquired ownership of Keasbey stock. T&N also did not manufacture any products, let alone asbestos-containing products, at the Nicolet site. Only Keasbey and Nicolet did so.

Additionally, we cannot confirm either the propriety of the testing methodologies used or the accuracy of the test results obtained for the Nicolet site because the Government deprived T&N of a meaningful opportunity to participate in and perform the remedial investigation.

Very truly yours,

Jon Schuyler Brooks

Jon Schuyler Brooks

JSB:MM
Enclosure
cc: John P. Mason, Esq.
Virginia Gibson-Mason, Esq.
Lydia Isales, Esq.
Joel Schneider, Esq.
D:S078053JSB

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III

841 Chestnut Building
Philadelphia, Pennsylvania 19107

SEP 30 1988

Mr. Jon Schuyler Brooks
Richards and O'Neil
885 Third Avenue
New York, New York 10022-4802

Dear Mr. Brooks:

This letter is in response to your letter dated July 29, 1988 in reference to the Ambler Asbestos Site Remedial Investigation and Feasibility Study (RI/FS). Also included with the letter was the report entitled "Comments on the Remedial Investigation/Feasibility Study for the Ambler Asbestos Piles Site, Ambler Pennsylvania" by ERT.

After reviewing the report it is the Agency's understanding that ERT concludes that the final proposed remedial action is too excessive and a less involved alternative should be considered. A major concern that was stated was the extent of the cap EPA has proposed. The depth as well as the aereal extent are open in discussion. Utilizing examples from other regions on the extent of cap dimensions to mitigate the freeze/thaw effect, the agency feels that the recommended dimensions are reasonable. Another concern you state is the contention that the endangerment assessment does not document an imminent and substantial threat. ERT directly cites the RI/FS as saying that the purpose of this endangerment assessment, as stated on page 6-1, is to "properly document and justify its assertion that, an imminent and substantial endangerment to the public health or welfare or the environment resulting from an actual or threatened release of a hazardous substance may exist." It is important to note that "imminent" does not mean immediate harm; rather, it means an impending risk of harm. Sufficient justification for determination of an imminent endangerment may exist if harm is threatened; no actual injury need have occurred or be occurring. Similarly, "endangerment" means something less than actual harm. There is a real potential for imminent harm in the Ambler Site. There were also various detailed criticisms of the report which could be better discussed at our meeting on September 30, 1988.

It is the agency's firm belief that the proposed remedy is the most acceptable alternative of all the options presented in the report. It adequately addressed all potential human health and environmental threats and provides the best protection utilizing the current CERCLA and NCP guidelines.

It is my understanding that you have been in contact wi Ms. Virginia Gibson-Mason, Esq., Ms. Lydia Isales, Esq., and Mr. Hector M. Abreu Cintron to discuss the possibility of further evaluating the comments presented in the ERT Report by holding a meeting. We are looking forward to our meeting and the Agency believe it will be beneficial for both parties. Specific details can be discussed about the ERT Report.

If you have any questions, please call Hector Abreu Cintron at (215) 597-9562.

Sincerely,

Steven R Hirsh

Karen M. Wolper, Chief for KW
SARA Special Sites Section

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NEW JERSEY OFFICE
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(609) 795-7611

July 29, 1988

HAND DELIVER

Virginia Gibson-Mason, Esquire
U.S. Department of Justice
3310 U.S. Courthouse
601 Market Street
Philadelphia, PA 19106

Lydia Isales, Esquire
Office of Regional Counsel
U.S. - EPA
841 Chestnut Building
Philadelphia, PA 19107

Re: U.S. v. Nicolet, Inc, et al.
Our File No: PR1000-2

Dear Virginia and Lydia:

This letter, with attachments, shall serve as Nicolet's comments on the RI/FS. As previously noted, Nicolet objects to the arbitrary and haphazard manner in which the government decided when these comments would be due.

Attached to this letter is the original and one (1) copy of the report of Nicolet's consultant - Environmental Resources Management. The original report is being delivered to Lydia and a copy to Virginia. As the attached curriculum vitaes indicate, ERM has extensive experience in this area and their opinions are entitled to great deference. Our comments can be summarized as follows:

1. We agree that on-site containment is the most appropriate option at the Nicolet site. Off-site disposal and vitrification may create more problems than those which they seek to remove. Moreover, vitrification is an unproven remedy.

2. In view of the lack of any present danger at the site, and the lack of proof of any significant future danger or risk, it is inappropriate and unnecessary to perform the extensive remedial work that is proposed. We believe that some relatively minor items need to be addressed but that the extensive work that is proposed should not be done. Site monitoring can be conducted to assure that conditions at the site do not deteriorate.

3. The RI/FS is based on data and inspections which do not accurately reflect the current conditions at the site. As the attached photographs and slides evidence, there is substantial vegetation on the piles. This vegetation substantially reduces the remote possibility of any release from the piles.

4. The contractor's cost estimates are excessive.

5. ERM essentially proposes patching of some minor bare areas, trimming of some vegetation and the use of riprap instead of gabions. In addition, it is unnecessary and dangerous to put a 36" cover over the plateau of the piles.

In addition to ERM's report Nicolet submits the following comments:

1. THE RI/FS IS BASED ON AN INADEQUATE AND ONE-SIDED HISTORICAL PRESENTATION OF THE FACTS REGARDING THE PILES.

The RI/FS recognizes at page 3-1 that historical information concerning the piles is important to the current evaulation. The report states:

> These data [important historical information] for the uncovered piles are important for the assessment of the long-term environmental and public health concerns discussed in subsection 5.4.2 (Contamination Assessment Long Term Condition) and Section 7.0 (Risk Assessment).

Nevertheless, the RI/FS ignores important historical information regarding the pile that supports Nicolet's position that there has been and is no danger or risk associated with the site.

Attached is a copy of Bruce Potoka deposition exhibits 11, 12 and 13 wherein it is indicated, inter alia, that the Nicolet site is not a health hazard. Also attached is a copy of the EPA's own June, 1979 document which delists the Nicolet site from the EPA active list of hazardous waste site. Therein it is noted that it has been determined that the wastes are relatively immobile in the environment and do not present a serious health and environmental situation. The RI/FS also fails to discuss in detail the results of the Equitable Environmental Health Air Asbestos Monitoring which took place in March and June of 1977 and which are included as items 4 and 5 in the government's "Administrative Record". The March, 1977 report notes on page 29:

> The implication of the results of the previous study, together with the most recent sampling data, suggests that fugitive asbestos emissions from the exposed surfaces of the inactive pile are insignificant and infrequent. Furthermore, the results indicate that measurable asbestos levels in the vicinity of the inactive pile, in some cases, may be independent of the condition of the pile.

The October, 1977 report (June, 1977 sampling) confirms the earlier testing and states, "it still appears that the non-occupational level of exposure for residents in the nearby community is extremely low."

In view of the above, and Weston's admission that historical information is important to properly evaluate the current and future site conditions, it is evident that the opinions expressed in the RI/FS are based upon an incomplete record untainted by available evidence which supports Nicolet's position.

2. THE PROPOSED USE OF 36" OF FILL MATERIAL IS INAPPROPRIATE FOR THESE PILES.

As indicated in ERM's report, it is not necessary to cover any areas of the piles with a 36" cover. The Plant and Locust Street piles were covered with material less than half this thickness. ERM recognizes the efficacy of this thickness by not proposing that additional cover material be added. Moreover, in determining the appropriate cover material for the piles Weston ignore other relevant sites. For example, the Gravers Road site in Plymouth Township, Montgomery County, is substantially similar to the Nicolet site. When that response action took place Nicolet is under the impression that only a 6" soil cover was used. In addition, we understand that with regard to the Globe, Arizona and Tyler, Texas asbestos sites, cover material substantially less than 36" was used. Weston also did not consider the thickness of the Maple Avenue pile which is performing satisfactorily at this time.

3. THE RI/FS DEMONSTRATES THAT THERE IS AN INSUFFICIENT RISK OF HARM IN THE FUTURE TO JUSTIFY THE SUBSTANTIAL REMEDIAL ACTIONS THAT ARE PROPOSED.

After an extensive analysis, the RI/FS does not reveal any significant risks which will occur in the future. Instead to justify the wasteful expenditure of millions of dollars, Weston engages in speculation such as:

> The results do indicate, however, the presence of potential asbestos sources in the site area which might affect ambient air quality. (p. 6-49, emphasis supplied.)

The RI/FS also states:

> "[F]uture pile cover deterioration and in addition, lagoon discharges during large storms could potentially create measurable risks..." (p. 7-3, emphasis supplied)

This type of guesswork is inappropriate in light of statements such as:

> [N]o existing unacceptable risks which are directly attributable to this site were found as related to inhalation of asbestos contaminated ambient air. (p. 7-1)

The decision of whether or not to take substantial remedial action at the Nicolet site must be based on the results of the RI. The RI does not indicate that substantial risks are expected in the future or exist at the present time. If the government is concerned about future problems at the site they can be addressed by an appropriate inspection and maintenance program. It is contrary to the dictates of the National Contingency Plan and Section 121 of CERCLA to spend millions of dollars to address speculative risks which the data indicates will not arise in the future.

4. THE RI/FS DOES NOT TAKE INTO CONSIDERATION THE SUBSTANTIAL VEGETATION AT THE SITE THAT HAS DEVELOPED SINCE THE RI.

As ERM's photographs and slides graphically demonstrate, there is substantial vegetation at the Nicolet site at the present time. It does not appear that when the RI was performed that this extensive vegetation was present. This substantial cover material reduces the potential for releases from the site. The RI/FS does not properly take into consideration the increased vegetation that will occur in the future.

5. NUMEROUS ERRORS IN THE RI/FS NEED TO BE ADDRESSED.

There are numerous errors in the RI/FS that need to be addressed. Some of the most important items are as follows:

1. Page 1-2 refers to the June, 1983 test results which Bruce Potoka testified were not reliable since no QA/QC was done.

2. Page 1-5 states that mesotheliomas have been identified in individuals living near asbestos plants without any references. The report does not discuss or mention Dr. Rodman's affidavit (attached) which indicates that the Nicolet piles did not even present a danger before the initial response action.

3. Page 1-37 of the report notes that Nicolet would not comply with the specific terms of cleanup outlined by the EPA. Nicolet disputes this statement and as it has previously stated it was prepared to conduct the response action requested by the government.

4. Page 1-36 of the report discussing the history regarding actions at the site fails to mention that the negative publicity regarding the Globe, Arizona site led the EPA to investigate the Nicolet condition.

5. Page 3-41 states that the samples showed a "measurable accumulation" of asbestos. The statement is denied. In addition, the RI/FS implies that the asbestos came from the piles when there is no evidence to this effect. Bruce Potoka and Jeff Pike both testified to the numerous potential sources of asbestos in the area. The RI/FS is also replete with references to ambient asbestos.

Thank you for your attention to this matter. We sincerely hope the government will reevaluate the proposal set forth in the RI/FS and agree with us that only minimal work is appropriate in view of the complete absence of any information to indicate substantial present or future risks at the site.

Sincerely,

MANTA AND WELGE

By: ______________________
Joel Schneider

JS/smp

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SEP 30 1988

Mr. Joel Schneider
Manta and Welge
One Commerce Square
2005 Market Street
Philadelphia, PA 19103

Dear Mr. Schneider:

This letter is in response to your letter dated July 29, 1988 in reference to the Ambler Asbestos Site Remedial Investigation and Feasibility Study (RI/FS). Also included with the letter was the report entitled "Review comments on Nicolet Site RI/FS Report" by Environmental Resources Management (ERM).

After reviewing the report, it is the Agency's understanding that ERM agrees with the proposed remedial action of the RI/FS. On page 7-1, it states the following: "ERM recommends a closure method consisting of riprap along the Wissahickon Creek, patching of bare spots on the top and slope areas of the piles, surface water control measures (e.g., swales, flumes, ditches and settling basins), and security measures (e.g., a complete fence surrounding the piles and lagoons and gates with locks). In addition, a post-closure inspection and maintenance program should be provided."

With the exception of your not addressing the settling ponds contamination, your suggestion is equivalent to the preferred remedy selected by EPA. There are specific comments that are stated by ERM however that should be discussed. Your statement that no potential exists for the release of asbestos in the future is unsubstantiated. The unchecked erosion would definitely affect the stability of the site. Most of your observations (slides) seem to have been made from the air (a plane, helicopter, etc.). A closer inspection would supply you with better information on the potential for future erosion problems.

If you wish to discuss the specific comments of the report, we could arrange a meeting. If you have any comments, please call Mr. Hector Abreu Cintron at (215) 597-9562.

Sincerely,

Steven R Hirsh for KW

Karen M. Wolper, Chief
SARA Special Sites Section

Peter H. Peschke
235 Tulip Tree Court
Blue Bell, PA 19422
(215) 646-4674

June 24, 1988

Mr. Hector Abreu-Cintron (3HW17)
Remedial Project Manager
U. S. EPA - Region III
841 Chestnut Street
Philadelphia, PA 19107

Subject: Ambler Asbestos Piles Site

Dear Mr. Abreu-Cintron:

After having attended the June 16, 1988 meeting on the above subject at the Ambler Borough Hall and reviewed the various proposals, I am finally convinced that the best long-range solution is Alternative 2: Excavation/Removal Off-Site Disposal, both from an economic and safety as well as aestetic standpoint.

Consequently and based on a preliminary review of the data and my method of disposal, the cost of Alternative 2 should not exceed $25 million based on the following:

Volume: not to exceed 1.3 million cubic yards.
Duration: Maximum 3 years.

My other conditions for this site are:

1. Transfer of ownership of the site to my organization with 1/3 of the area to be dedicated to the Borough of Ambler for township facilities (Borough Hall, Police, Maintenance, etc.)

2. Ten years exemption from local and county real estate taxes for the remaining 2/3 of the area from start of contract.

3. Flexible commercial/institutional/residential zoning for the remaining 2/3 of the area.

4. 20% royalty/management/administration fee to clear all other asbestos piles in the USA using my method of disposal.

5. Execution of an appropriate confidentiality agreement with all concerned parties before details of my method of disposal can be discussed.

RECEIVED

JUN 28 1988

SARA, Special Site Section

I would appreciate it if you could arrange a preliminary meeting between us and/or other interested parties as well as a site inspection as soon as possible.

Sincerely,

Peter H. Peschke

CC: Mr. Michael Heayn, Mayor of Ambler

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SEP 28 1988

Mr. Peter Peschke
235 Tulip Tree Court
Blue Bell, PA 19422

Dear Mr. Peschke:

This letter is in response to your letter dated July 28, 1988 that followed our July 26, 1988 meeting in reference to the Ambler Asbestos Site.

After our meeting, your proposal for off-site disposal was analyzed thoroughly and it was concluded that your alternative can not be considered further for remediation the Ambler Asbestos Site for the following reasons:

1. Off-site transportation - Our previous review of off-site transportation of the asbestos convinced us that the threat of exposure during any removal operation was too great to consider the alternative further. In addition, the Comprehensive Environmental Response Compensation and Liability Act discourages against the off-site transport of hazardous materials as a remedial action and promotes practicable treatment when possible. We have determined that the practicable treatment remediation of the asbestos piles is containment.

2. Waste Volume - The tremendous volume of waste in the Ambler Asbestos Site would require an extensive period of excavation and as a result, a severe long term exposure of asbestos to the city of Ambler.

3. Selection of Disposal Site - The proposal was inadequate in that it did not provide for an disposal site for the asbestos. An exceptable landfill would have to be found that would and can accept this type of waste. Any asbestos landfill requires necessary State permitting approval.

4. Costs - Your requirements pursuant to the costs that would be incurred are not reasonable and simply out of our jurisdiction. Further, we do not have the authority to transfer the property to anyone, as the owner of the property is still Nicolet Inc. and who ever acquires the site will be responsible for it's maintenance.

Local tax exemptions are also out of EPA's jurisdiction, as this would be more properly addressed to the county or Borough. Finally, the royalty/management administration fee for your method is your right and it cannot be granted by EPA.

In conclusion, the Agency believes that your method of removal would not be applicable to the remediation at the Ambler Asbestos Site.

If you would like us to return your proposal to you, or if you have any question please call me at (215) 597-8751.

Sincerely,

Karen M Wolper

Karen M. Wolper, Chief
SARA Special Sites Section

BO RIT CORPORATION
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428
(215) 825-8410

RECEIVED

JUN 21 1988

SARA, Special Site Section
EPA, Region III

PLANT:
6 MAPLE STREET
AMBLER, PA 19002

Hector Abreu - Cintron
Remedial Project Manager
U.S. E.P.A. Region III
841 Chestnut Street
Phila., Pa. 19107

June 17,1988

RE: Nickolet Asbestos Piles
Ambler, Pa.

Dear Hector,

I am glad we had a chance to meet you Thursday evening at the Ambler Borough meeting.

As we had discussed, I am enclosing for your review a copy of our application to the PA. D. E. R. to process cement block made from sludge containing asbestos.

I feel the information in this packet should fill you in on how our process will work, and what steps we will take to secure the asbestos from being airborne.

If you should need any further information or if you have any questions please call.

Sincerely,

BO RIT CORPORATION

Michael J. Rittenhouse

Encs.

Submit in Triplicate

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF AIR QUALITY CONTROL

Page 1 of 4

GENERAL SOURCE

Application for Plan Approval to Construct, Modify or Reactivate an Air Contamination Source and/or Air Cleaning Device and for a Permit to Operate

Section A Identity and Location of Air Contamination Source

1A. Application is being made for:
☐ Construction of New Source/Operating Permit
☐ Reactivation of a Source/Operating Permit
☒ Modification of Existing Source/Operating Permit
☐ Installation of Air Cleaning Device/Operating Permit
☐ Amendment to a Previous Application
Previous Application No. __ __ - __ __ __ - __ __ __
☐ Other ____________

OFFICIAL USE ONLY
Application No. __ __ - __ __ __ - __ __ __
Plant Code ____________ Unit ID ____________
Date Received ____________
Reviewed By ____________
Potential Emissions (TPY)
PM ______ SO_2 ______ VOC ______
NOX ______ CO ______ Other ______
Actual Emissions (TPY)
PM ______ SO_2 ______ VOC ______
NOX ______ CO ______ Other ______
Change in Actual Emissions (+ or -)
PM ______ SO_2 ______ VOC ______
NOX ______ CO ______ Other ______

1B. Type of source
BY PRODUCT CONTAINING 20% ASBESTOS

1C. Plant in which source is located
☒ NEW ☐ EXISTING

1D. If source is new, does it replace another source (describe source replaced) ☐ YES ☒ NO

1E. Expected date of completion
1-30-91

2A. Owner of source
BO RIT CORPORATION

2B. Employer I.D. No. (Federal IRS No.)
2 3 - 1 9 4 8 8 6 5

3A. Owners designation of source and/or plant if any

3B. Location of source (Street address or Route No.)
6 MAPLE AVENUE
Political Subdivision (Township, etc.)
AMBLER
County
MONTGOMERY

3C. Mailing address (Street or P.O. Box, City, Zip Code)
601 WASHINGTON STREET, CONSHOHOCKEN, PA 19428

3D. Telephone No.
(215) 825-8410

4A. Person to contact regarding this Application (name and title)
JOHN S. RITTENHOUSE

4B. Mailing address (Street or P.O. Box, City, State, Zip Code)
601 WASHINGTON ST., CONSHOHOCKEN, PA

4C. Telephone No.
(215) 825-8410

Official signing application must be an agent of the Company having primary responsibilities for operation of the facility to which this application applies. Although he may not have participated in the design of the facility he should be responsible for approval of the design.

AFFIDAVIT

I ____________________, being duly sworn according to law depose and say that I am he official having primary responsibility for the design and operation of the facilities to which this application applies nd that the information included in the foregoing application is true to the best of my knowledge, information and belief.

worn to and subscribed before me this 4th day
JANUARY 1988

otary Public

Signature

Title

-16: Rev.

Page 2 of 4

Section B General Source Information

1 SOURCE

2 NORMAL PROCESS OPERATING SCHEDULE

	A Type Source (Describe)	B Manufacturer of Source	C Model No.	D Rated Capacity (Specify units)	E Type of Materials Processed	A Amount Processed/yr. (Specify units)	B Average hr/day	C Total hr/yr	D % Thruput/Quarter 1st	2nd	3rd	4th
1	SLUDGE CONTAINING 20% ASBESTOS	KEASBY-MADISON	N/A	N/A	ASBESTOS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2												
3												
4												
5												
6												
7												
8												
9												
0												

3 ESTIMATED FUEL USAGE (Specify Units)

4 ANNUAL FUEL USAGE

B Type Fuel	C. Average Hourly Rate	D. Maximum Hourly Rate	E Percent Sulfur	F Percent Ash	G Heating Value	A Annual Amounts	B Average hr/day	C Total hr/yr	D % Thruput/Quarter 1st	2nd	3rd	4th
N/A												

162

ORTANT Attach flow diagram of process giving all (gaseous, liquid, and solid) flow rates (attach separate sheet) [illegible]

Section B Source Information Continued

6. Describe fully the facilities provided to monitor and record all operating conditions that may affect the emission of air contaminants. Provide detailed information to show that the facilities provided are adequate.

PURCHASED ONE (1) MICRO MAX AIR TESTING PUMP FROM ACT I

7. Describe modifications to process equipment in detail.

8. Type and method of disposal of all waste materials generated by this process.

N/A

Is a Solid Waste Disposal Permit Needed? ☐ Yes ☒ No

9. Briefly describe the method of handling the waste water from this process and its associated air pollution control equipment.

N/A

Is a Water Quality Management Permit Needed? ☐ Yes ☒ No

10. Attach any and all additional information necessary to adequately describe the process equipment and to perform a thorough evaluation of the extent and nature of its emissions.

ATTACHED - COPY OF MICRO MAX LITERATURE - 3 COPIES

Section E Miscellaneous Information

1. Describe fully facilities to monitor and record the emission of air contaminants. Provide detailed information to show that the facilities provided are adequate. Include cost and maintenance information. Periodic maintenance reports are to be submitted to the Department.

☐ Opacity monitor

☐ SOx monitor

☒ Other MICRO MAX I

If checked provide manufacturer name, model no. and pertinent technical specifications.

ASBESTOS CONTROL TECHNOLOGY INC.
MICRO MAX I SER. #07638
AIR FLOW RANGE FOR SAMPLING
5 - 15 LITERS PER MINUTE (018-0.53 CU.FT. PER MINUTE)
PUMP POWER 1/6 HP (0.2KW)

2. Attach Air Pollution Episode Strategy (if applicable)

N/A

3. The following requirements are applicable only to construction only to construction of a new source.
   - a. Briefly describe the nature of the area in which the proposed source is located. Attach a copy of the appropriate portion of the quadrangle map (7½' scale) published by the U.S. Geological Survey and identify the location of proposed source.

N/A

   - b. Demonstrate that the establishment of the new source is justifiable as a result of necessary economic or social development.

N/A

4. If the source is subject to Section 127.63 (special permit requirements)
   - a. Demonstrate the availability of emission offset (if applicable)

N/A

   - b. Provide an analysis of alternate sites, sizes, production processes and environmental control techniques demonstrating that the benefits of the proposed source outweigh the environmental and social costs.

N/A

5. Attach calculations and any additional information necessary to thoroughly evaluate compliance with all the applicable requirements of Article III of the rules and regulations of the Department of Environmental Resources and those requirements promulgated by the Administrator of the United States Environmental Protection Agency pursuant to the provisions of the Clean Air Act.

N/A

List all attachments made to this Application.

- LITERATURE ON MICRO MAX I AIR SAMPLING PUMP

PENNSYLVANIA
DER

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
1875 New Hope Street
Norristown, PA 19401
215 270-1920

January 11, 1988

BoRit Corporation
601 Washington Street
Conshohocken, PA 19428

Attention: Mr. Michael J. Rittenhouse
Vice-President

Gentlemen:

Please be advised that additional information is needed by the Department in order to process your Plan Approval Application for modifying a process where asbestos incapsulated cement is produced from sludge containing 20%, asbestos at your facility in Ambler Borough, Montgomery County which we received on January 4, 1988.

This additional information is:

a. latitude of your facility,
b. longitude of your facility,
c. estimate of total acreage of your facility.

Further processing of your application must await receipt by us of your answers to the above needed information.

Should you have any questions on this matter, please contact me.

Very truly yours,

James P. Donnelly

JAMES P. DONNELLY, P.E.
Air Pollution Control Engineer

Re 30 (SMC)11.5

BO RIT CORPORATION
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428
(215) 825-8410

PLANT:
6 MAPLE STREET
AMBLER, PA 19002

January 19, 1988

Commonwealth of Pennsylvania
Dept. of Environmental Resources
1875 New Hope Street
Norristown, PA 19401

Attn: James P. Donnelly, P.E.

RE: 6 Maple Ave. Ambler
Y/F: 30 (SMC).11.5

Dear Mr. Donnelly:

As per your letter dated January 11, 1988, listed below is the information you requested:

Latitude:	40°	9'	-	13"	North
Longitude	75°	13'	-	40"	West
Acres:	6±				

Enclosed please find a copy of the location map of the facility.

If you have any questions please do not hesitate to call.

Sincerely,

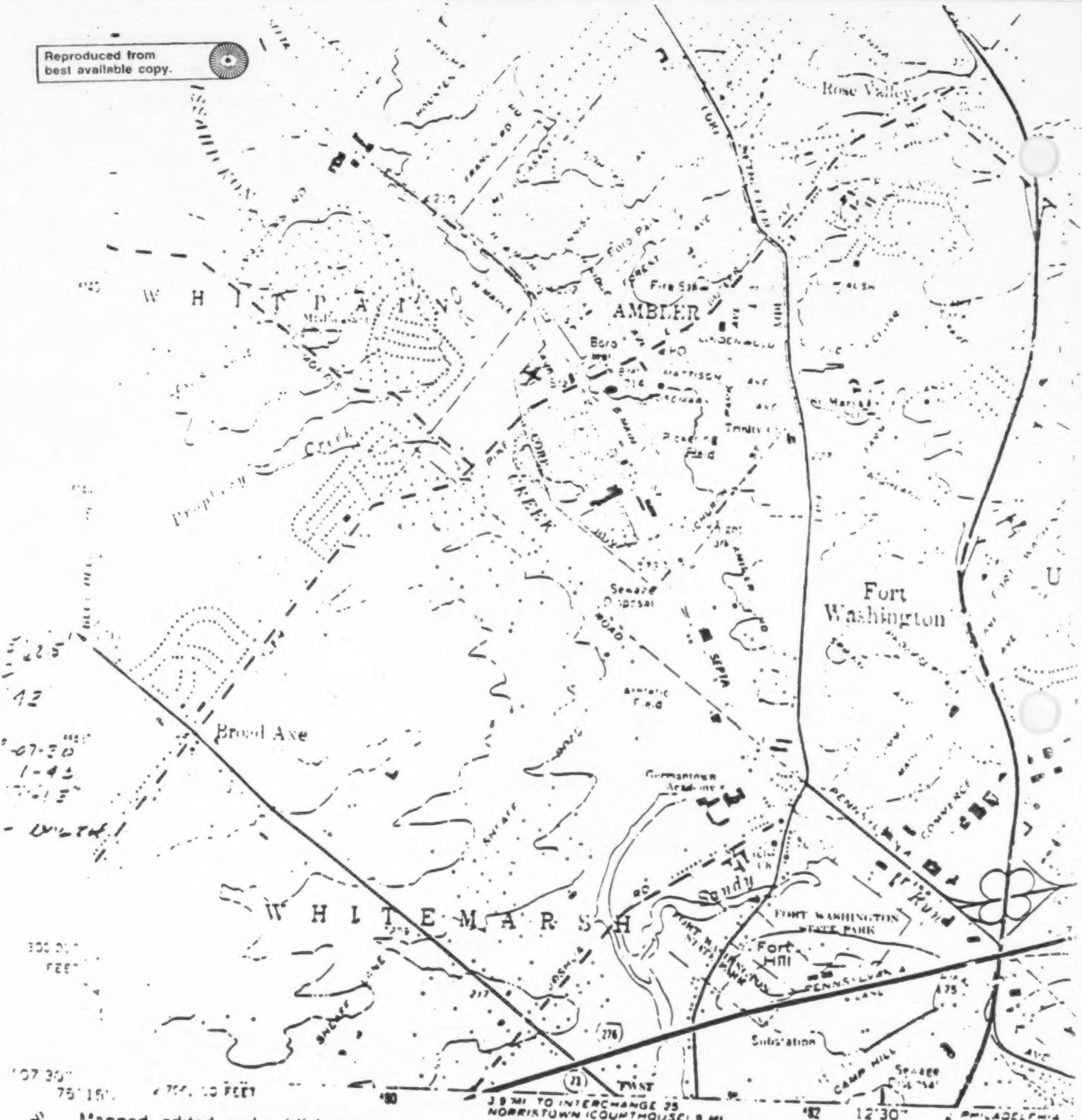
BO RIT CORPORATION

Michael J. Rittenhouse

MJR:rr

Enc.

Reproduced from
best available copy.


Rose Valley
W H I T P A I N
AMBLER
Fire Sta
Boro Hall
PO
Tannery
Pickering Field
Sewage Disposal
Athletic Field
Fort Washington
Broad Ave
Germantown Academy
Sandy Run
FORT WASHINGTON STATE PARK
Fort Hill
W H I T E M A R S H
Substation
CAMP HILL
Sewage Disposal
PENNSYLVANIA
276
73
TWST
07'30"
75°15'
2 760 000 FEET
480
482
12'30"
3.9 MI TO INTERCHANGE 25
NORRISTOWN (COURTHOUSE) 9 MI
PHILADELPHIA

Mapped, edited, and published by the Geological Survey
in cooperation with Pennsylvania Department of
Internal Affairs, Topographic and Geologic Survey

Control by USGS and NOS/NOAA

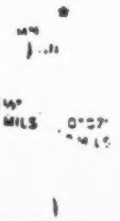
Topography by photogrammetric methods from aerial photographs taken 1950. Field checked 1952. Revised from aerial photographs taken 1965. Map edited 1966

Polyconic projection. 10,000-foot grid ticks based on Pennsylvania coordinate system, south zone. 1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue. 1927 North American Datum

To place on the predicted North American Datum 1983 move the projection lines 6 meters south and 31 meters west as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Red tint indicates areas in which only landmark buildings are shown


MN
11½°
204 MILS
0°37'

UTM GRID AND 1983 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

2.5⁴
5.8

75 16

1'20

75' 13' 113

167

BO RIT CORPORATION
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428
(215) 825-8410

PLANT:
6 MAPLE STREET
AMBLER, PA 19002

U.S. E.P.A.
Region III
841 Chestnut Street
Philadelphia, PA 19107

Attn: Hector Abreu-Cintron
Remedial Project Manager

RE: Nicolet's Asbestos Piles
Ambler, PA

Dear Hector:

This letter is a formal request for an extension for your considering alternative measures at Nicolet's Asbestos Mounds.

We would like you to consider our process, as per our letter dated June 17, 1988, to make concrete blocks to encapsulate Nicolet's Piles.

Your attention on this matter would be greatly appreciated. If you have any questions, please contact the undersigned.

Sincerely,

Michael J. Rittenhouse

MJR:rr

RECEIVED

JUN 30 1988

SARA, Special Site Section
EPA, Region III

BO RIT CORPORATION
601 WASHINGTON STREET
CONSHOHOCKEN, PA 19428
(215) 825-8410

PLANT:
6 MAPLE STREET
AMBLER, PA 19002

July 29, 1988

Environmental Protection Agency
Region III
841 Chestnut Street
Philadelphia, PA 19107

Attn: Hector Abreu-Cintron
Remedial Proj. Mgr.

RE: Nicolet Super Fund Site
Ambler, PA

Dear Hector:

The following is a brief outline and scope of work to be done in order to encapsulate the above material.

(1) Concrete blocks will be manufactured as outlined in the application to the D.E.R., dated January 4, 1988.

During manufacturing, all D.E.R., E.P.A. and Osha requirements concerning the handling of Asbestos material will be observed in order to insure safety and integrity of surrounding humans, land, air and water.

(2) A poured concrete footing measuring 6 feet in width and around the perimeter of Nicolet's asbestos mounds, measuring 7,000 feet.

(3) The concrete blocks will construst a wall 4 feet thick, and 40 feet high. (Drawing enclosed)

(4) Voids between the present mounds and walls will be filled by displacement of present material or the addition of clean fill.

(5) The top will be covered with 2 feet of clean fill put in place by conveyor and then covered with single ply vulcanized rubber roofing. The roof will be pitched so that all water will be drained into proper gutters and directed to a central location for analysis and monitoring.

(con't.)

(6) The walls will then be coated with a poly vinyl acetate that will be imperious to rain. The walls will have architectual design to present an eye appealing environment.

The approximate cost of the project is $3.8 million dollars.

If you have any questions or comments, please call.

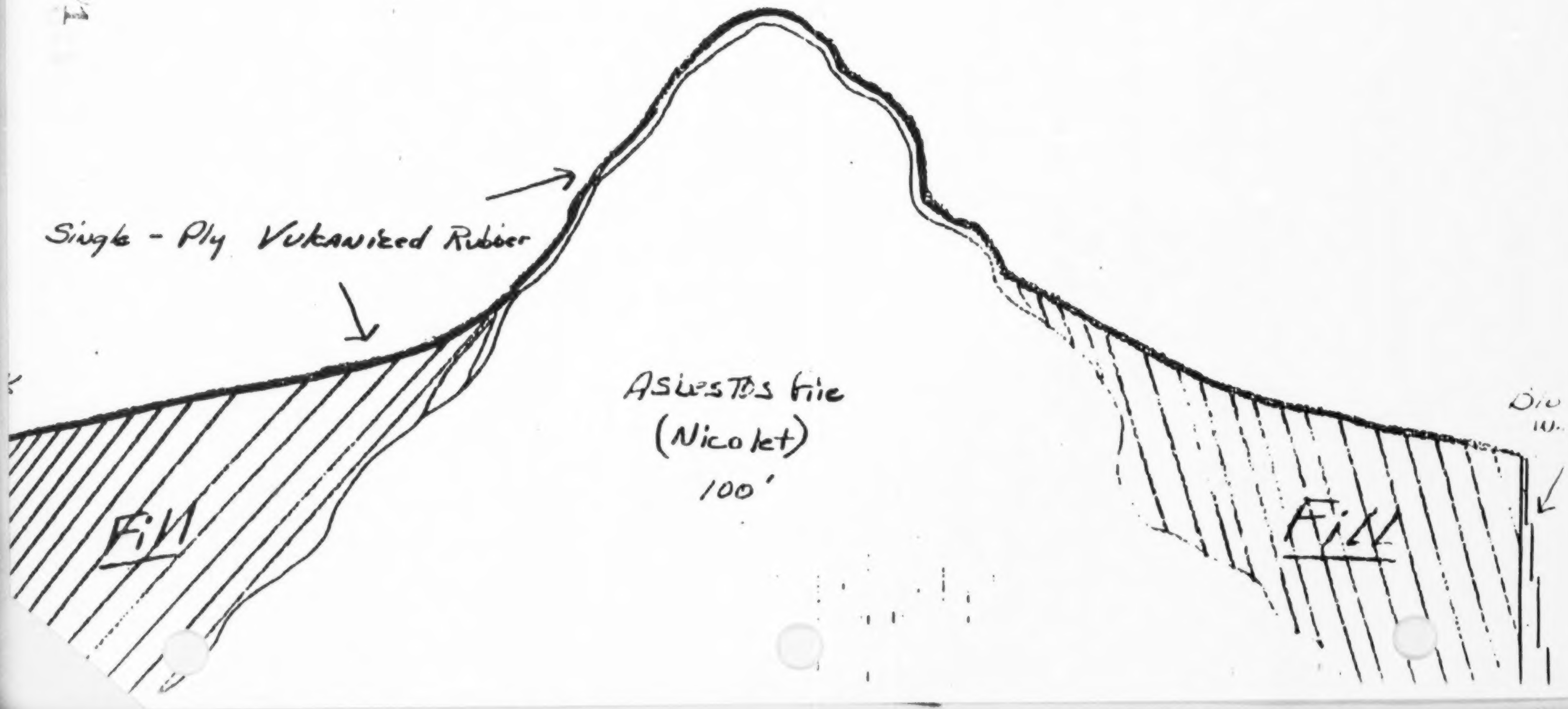
Sincerely,

BO RIT CORPORATION

Michael Rittenhouse

MJR:rr

Enc.


Single - Ply Vulcanized Rubber
Asbestos Tile
(Nicolet)
100'
Fill
Fill

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SEP 30 1988

Mr. Michael J. Rittenhouse
Bo-Rit Corporation
601 Washington Street
Conshohocken, PA 19428

Dear Mr. Rittenhouse:

This letter is in response to your letter dated June 17, 1988 that followed our July 22, 1988 meeting in reference to the Ambler Asbestos Site.

After our meeting, your proposal for was analyzed thoroughly and it was concluded that you alternative cannot be applied to the Ambler Asbestos Site for the following reasons:

1. Waste Volume - The tremendous volume of waste in the Ambler Asbestos Site would require an extensive time period for iis implementation and would expose the city of Ambler to long-term contamination problems from asbestos emissions.

2. Integrity of blocks - The integrity of the blocks cannot be guaranteed unless the blocks are individually covered with a protective plastic lining. The large calcium carbonate content of the piles would produce a very basic (as opposed to acidic) material thus the potential for erosion and leaching due to the environmental elements is great.

3. Use of blocks - Though it has been suggested that the blocks can be used around the toe of the piles or to build a large wall by itself, the final product is not usable.

In general the Agency feels that your technology is very sound for specific cases and innovative in its approach to asbestos contamination. The possibility of applying it to the Maple Avenue Piles is great. This conclusion is based upon the suspected composition of your pile, and the volume of the waste present. As stated in our meeting, we feel that you would need to collect more data on the internal characteristics of your pile (either through borings or trenching).

If you have any questions on how you can collect the data (methodology, etc.) or on this letter, please call me at (215) 597-9562.

Sincerely,

Hector M. Abreu-Cintron

Hector Abreu-Cintron
Environmental Officer

Geotech
DEVELOPMENT CORPORATION

August 2, 1988

Mr. Hector M. Abreu Cintron
U.S. ENVIRONMENTAL PROTECTION AGENCY
841 Chestnut Bldg.
Philadelphia, PA 19107

Dear Hector:

We enjoyed our meeting with you and Frank Finger at Weston's offices on the 28th. We feel that the fusion process we described at that time offers several significant advantages as problematic waste destruction method.

Since electrode and power input configuration uses the materials' resistivity to raise the temperature up to and above the fusion point with a sufficient dwell time to completely destroy any crystallinity that the materials may have, the resulting glass is non-leachable and non-biodegradable.

While there is no appreciable change in material mass, there is a significant volume reduction. In the case of municipal solid waste ash, this volume reduction is on the order of ten to one. Asbestos containing materials may be as much as four to one. Thus, unlike "vitrification" that actually adds to the final volume and mass of the materials, there is a reduction in final materials' volume using direct fusion. I have enclosed a copy of our Research Description for your review.

I appreciate your advice about the EPA site program headquartered at MST in Washington. I am asking that you forward a copy of this transmittal to the appropriate individual there. If you could let me know who that is, I will follow up with them.

Thanks again for your time.

Very truly yours,

GEOTECH DEVELOPMENT CORPORATION

Thomas R Tate
Thomas R. Tate
V.P. Marketing & Sales

TRT:pd
Enclosure

RECEIVED
AUG 5 1988
SARA, Special Site Section
EPA, Region III

630 Valley Forge Plaza Bldg. ◆ King of Prussia, PA 19406 ◆ Telephone: (215) 337-8515

(Research Description)

DESCRIPTION OF INCINERATOR-ASH VITRIFICATION PROCESSES

Submerged Electrode Furnace (WGV)

Source of Technology: Geotech Development Corporation
630 Valley Forge Plaza Bldg.
King of Prussia, PA 19406
(215) 337-8515
Contact: Mr. T.R. Tate

System Description

The heart of the system is the water cooled double wall steel vessel with submerged electrode resistance melting. The vessel is bottom pour and designed to pour continuously. The real advantage is the electrical balance we can achieve in our system to feed, melt and pour in a stabilized and balanced condition. Ash or residue is fed automatically or manually depending on the volume.

Facility Requirements

ASH

The entire system for a plant processing 100 tons of dry ash to glass per day will occupy a plant floor area of approximately 24,500 ft.^{2}, 126' x 194'. This area does not include warehousing of finished products. Warehouse size will depend on product mix and marketing strategies.

Energy requirement is 460 KWH per ton of melt. This is 3680 KWH per eight hour shift per ton; 24 hours of continuous production to melt 100 tons of ash will consume 46,000 KWH. The size of furnace is designed, therefore, for a continuous pour rate of over 8000 lbs./hour.

Feed is handled by slow rotating continuous non-dusting automatic feeder. Raw material from bins or silos can be mechanically or by means of air conveyed to automatic feeder. The product from spinning downline will proceed synchronously via Geotech designed Collector, Needler, Ovens and finishing end if vitreous fiber is being made. If glass beads or block are the production desired, then casting or solidification chamber is used.

ASBESTOS AND ASBESTOS CONTAINING MATERIALS

Double plastic bags containing asbestos residue are charged through charge doors and ramp. The furnace cover contains negative pressure to the dust collection system.

The enclosed furnace is further enclosed in a filtered air conditioned room that is slightly positively pressurized.

Energy requirements for asbestos containing material is estimated at 620 KWH per ton. This is 4960 KWH per eight hour shift per ton. Since the furnace will operate 24 hours per day on a continuous basis, a daily power usage will be 31,000 KWH per day for a 50 ton unit.

Energy Recovery

If the melt is cooled and fractured by water quench, there will not be provision for energy recovery. If the melt is spun into glass wool, all of the sensible heat will be available for space heating. There is no feasible opportunity for other energy recovery.

Final Product-Options, Descriptions, Potential Marketability

The glass melt will solidify and can be recovered as granular non-porous solids 3/8" and down. It will contain no water but will be water quenched in order to fracture to sizes required. There is little or no dust. It is possible to cast glassy block to 300 lbs. Larger sizes would require more expensive and sophisticated slow cool molds.

The following is a list of potential products and markets:

Glassification

Shore erosion Block
Decorative Tile
Non-leach Landfill
Future Mineral Bank

Pettitization

Blast Cleaning Grit
Road Bed Fill
Grog for Refractories
Cement Additive
Abrasive Surface
Non-leach Landfill

Fiberization

Ceramic Fibers
Mineral Wool Fibers
Vac. Formed Products
Wallboard
Ceramic Tile
Textile Fibers
Fireproof Cloth
(Asbestos Free)

High and Low Temp.
Industrial Furnace
Linings

Typical Current Market Prices

Metallics equivalent to No. 1 scrap $100/ton.

Grit (either removed from bottom ash) or finer particles from fracturing glass - $50/ton.

Mineral wool $390 to $740/ton depending on product and product mix.

Current Facilities: Operating History and Reliability

Czechoslovakia	-	operating since 1982 800 lbs./hr. - approx. 10 T/day
W. Germany	-	operating since 1983
France	-	operating since 1982
Italy	-	commissioned July 1986
Canada	-	shipped April 1986
Japan	-	commissioned Sept. 1986
Niagara Falls, NY	-	full sized facility used for R & D and sales since 1980

Life Cycle Cost

For a 100 T/day system to fuse fly ash or bottom ash pour and cast (glassification only).

$3,150,000	Furnace and Controls
1,800,000	Technology
120,000	Supervision on Site
$5,070,000	

Additional Capital

For a 100 T/day system to fuse, pour and spin mineral wool then collect, fabricate and package dry mineral wool products.

$1,000,000	Spinner and Controls
680,000	Collection chamber and equipment
68,000	Conveyors
136,000	Bagger and conveyor
28,000	Motor control center
$1.912,000	

Estimated Cost - Glass Beads or Block

Director Labor	.002
Power Consumption	.014
Raw Material	(.006)
Operating Maintenance	.005
Utilities (other than prod. power)	.001
Insurance	.001
Depreciation	.002
Interest	.005
	0.024

PRELIMINARY PRO FORMA

Incinerator Residue Fusion 300T/Day = 100,000 T/Year

Best Case		Worst Case
Capital Investment	$8,000,000	$ 8,000,000
Revenues @ $150/Ton	$16,500,000	11,000,000 @ $100/Ton

Direct Costs

Manpower @ $30,000 Yr.	$ 600,000	$ 600,000
Power Cost @ $.04 KWH	2,200,000	2,200,000
Electrode & Orifice Costs	300,000	300,000
General Maintenance	250,000	250,000
Other Utilities (heat, light, water)	225,000	225,000
Insurance	36,000	36,000
Depreciation	800,000	800,000
Contingency	250,000	250,000
Estimated Operating Cost	$ 4,661,000	$ 4,661,000
Estimated Pre-tax Gross	$11,839,000	$ 6,339,000

No allowance shown for products converted and sold.
No charges are included for products sent to sumpsite.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SEP 28 1988

Mr. Thomas R. Tate, Vice President
Marketing and Sales
Geo Tech Development Corporation
630 Valley Forge Plaza Building
King of Prussia, PA 19406

Dear Mr. Tate:

This letter is in response to your August 2, 1988 letter that followed our meeting on September 28, 1988 in reference to the Ambler Asbestos Site.

After our meeting, your proposed remedy for the Geo-Tech process was analyzed more thoroughly. We believe that more information is needed before EPA can make a final determination as to the Feasibility of the Geo-Tech process. Understanding your need also to study the situation further EPA has decided to include your remedy as one of the two potential alternatives that will be further evaluated during the design studies.

We will contact you for any additional information that we may require. If there are any questions, please call at (215) 597-8751.

Sincerely,

Karen M. Wolper

Karen M. Wolper, Chief
SARA Special Sites Section

VITRIFIX OF NORTH AMERICA, INC. 1321 DUKE STREET., ALEXANDRIA, VA 22314 (703) 684-1090 FAX (703) 684-3385

July 28, 1988

Mr. Hector M. Abreu Cintron
Project Manager
Hazardous Waste Enforcement Branch
U. S. Environmental Protection Agency
Sixth Floor
841 Chestnut Building
Philadelphia, PA 19107

Dear Mr. Abreu Cintron:

Vitrifix of North America has developed the enclosed documents based on the June 16, 1988 public hearing at Ambler, PA, our meeting on June 23, 1988 and the RI/FS for the Ambler Asbestos Piles. We have endeavored to provide clarification of relevant concerns pertaining to the Vitrifix technology and its application as well as correct the record regarding specific issues about the Vitrifix Process. A detailed review of RI/FS made it clear there were more points to be addressed than were initially apparent at the public hearing; hence the length of this transmittal.

Vitrifix submits this information so that the Hazardous Waste Enforcement Branch of the U. S. Environmental Protection Agency will have an increased and more accurate understanding of the Vitrifix Process and its capabilities for remediating asbestos contaminated sites. If I may answer any questions or provide additional information, please do not hesitate to contact me.

Best regards,

David Roberts

David Roberts
Executive Vice President

DR:km

Enclosures

A COMPANY CONCERNED WITH THE FUTURE OF OUR ENVIRONMENT...

LETTER RECEIVED FROM RESIDENT

Hector Abreu 6-18-88
E.P.A. Manager

As of 6-16-88 meeting. My comment is a problem with the fence that's about 200 ft. from our homes on Locust. We as residents of Locust St. would like for the fence to be moved farther back at the bottom of the slope. The fence being so close to our homes is a terrible eye sore. I hope you will take this in consideration.

Concerned Resident
Jean Thompson

Letter retyped due to reproduction difficulties

AMBLER LABORATORIES
AMBLER, PA.

CHEMICAL
BACTERIOLOGICAL

MITCHELL 6-1057
699-5737

RESEARCH
CONSULTING

June 28, 1988

Nanci Sinclair
Community Relations
EPA
841 Chestnut St.
Philadelphia, Pa. 19107

I will call this the "Romano Alternative" re the Locust Street "White Mountain" dump.

This alternative accomplishes what must be done at minimun cost, and a short time namely,

(1) it safely neutralizes the health hazard which translocation and Vitrifix will not do.

(2) it removes the objectionable vista of a hazardous dump even from the standpoint of the visual eyesore it is during seven dormant-vegetation months of the year.

(3) It makes the area useable as parks, gardens, baseball fields, or even some housing.

In so doing it utilizes EPA's earth cover idea to imoblize the asbestos mixture, and provides the benefit of total translocation and Vitri-fix's claim that it removes the material to make the land useable.

The principle of the Romano Alternative is to simply construct a stone and concrete wall (a sort of bottom-less box) or a rectangular-like shape enclosing the dump and of a size sufficient to be filled by leveling the dump using dust controlled quick bulldozing and the addition of a 3 foot earth cover.

The height of the box is made the key dimension (approximately 12 to 15 feet). Then the width and length is made sufficient to permit a vloume equal to the volume of the dump material with three feet of earth to cover it. There is sufficient flat area on both sides of the present dump to accomodate the "box", in particular on west side of the dump.

FOR EXAMPLE:

A "box" of 700 feet in length, 500 feet average width and, for example 15 feet high could accomodate a volume of 700X500X12 cubic feet, that is 5,250,000 cubic feet.

The Romano alternative would eliminate the hazard and eyesore, make the land area available , create a more pleasant image of Ambler. It will quickly accomplish this at least expense, and within one years time.